FOOD MANUFACTURE

Incorporating Food Industries Weekly

...RD HILL, LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 . . . . OCTOBER 1, 1955

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...ong Alloy
...Piece Pressings
...will interstack.

...STACKING CONTAINERS
...ranges now extended: CS.24157—23½" x 14½" x 7½"
CS.24155—23½" x 14½" x 5½"
CS.24153—23½" x 14½" x 3½"

- Absolutely hygienic and easy to clean
- Exceptionally strong rim obviating handles
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Decorated Tins

in all shapes and sizes

The Metal Box Company is well-known for the production of highly decorated boxes for the confectionery trade. These attractive containers, with their full-colour surface decoration and their suitability for re-use, make an immediate appeal to the purchasing public. The Company's design service and technical advice covers many types of package, including flexible film and film and foil laminates, as well as metal containers, cartons and composite containers. For Metal Box offers the complete packaging service and its know-how is at the disposal of all manufacturers with a packaging problem to solve.

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Know-how
does count!

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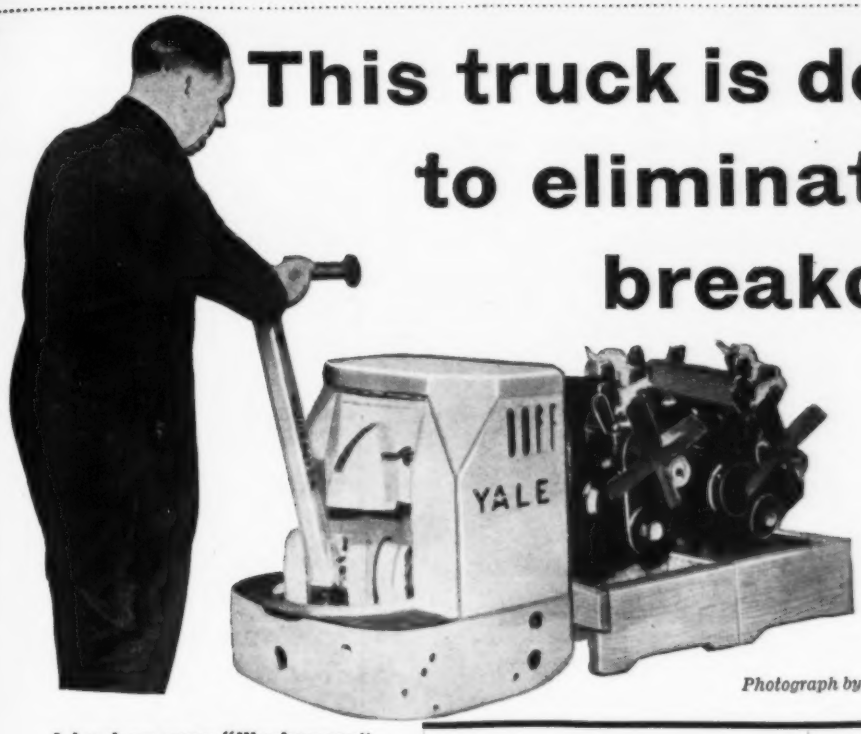
Metal Containers · Paper Products · Flexible Packages · Plastic Films and Laminates

THE LANGHAM · PORTLAND PLACE · LONDON W.1

This truck is designed to eliminate breakdowns

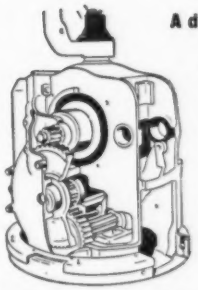


Photograph by courtesy of Humber Ltd., Coventry

A load on your "Worksaver" is a load off your mind!

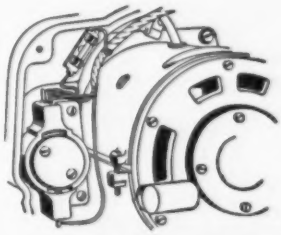
When mechanical handling equipment lies idle—waiting for attention or spares—production costs *shoot* up. Invest in a "Worksaver"; put it to work and compare its trouble-free service with any of your other trucks. Then you'll understand why so many plants—large and small—are changing to Yale.

The "Worksaver" is available in Fork Lift, Pallet, Platform and Tractor models.



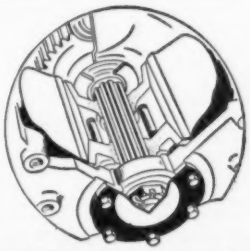
A drive unit that lasts a lifetime

This powerful, robust drive unit will stand up to a lifetime of rough handling. Gears are drop-forged nickel-chrome-molybdenum steel, heat-treated and mounted on ball bearings, operating in oil. Entire drive unit is enclosed and floats on 105 ball bearings.



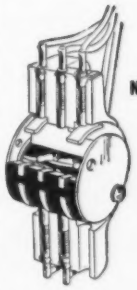
Simple to change brushes

Drive motor of a high torque series wound type, specially designed for easy cleaning and adjustment.



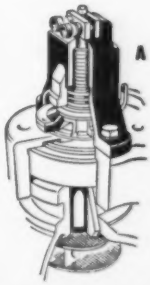
Split hub eliminates pressing in tyres

Worn-out tyres can be quickly replaced by using hand tools—an exclusive Yale feature.



No frayed, broken wires

On the "Worksaver", all flexing, chafing and bending of wires is eliminated. Slip rings are built into the base of the handle so that wiring cannot be twisted or bent, no matter how the handle is turned or lifted.

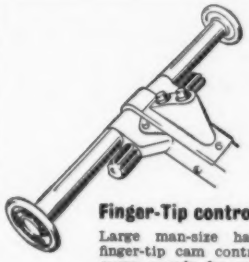


A capstan built to take the load and more

The load-carrying tapered roller bearing ensures perfect alignment of the unit. The power line is carried through silver contacts. Wires cannot bend whatever the angle of the turn.

Fully protected—easily accessible

The head and heart of the "Worksaver" is fully protected, yet easily accessible for adjustments and inspection. It can be removed from the truck in five minutes.



Finger-Tip control

Large man-size handles with finger-tip cam controls. Ends carry guards for safety. Two speeds forward and two reverse. Lift control and horn button in easy finger-reach position.

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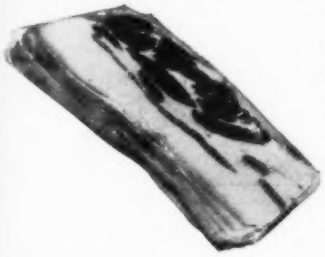
In DIOphane CELLULOSE FILM your product is SAFE, SEEN and SELECT!



SAFE *because all DIOphane films are dust- and greaseproof, some are moisture-proof, some even waterproof; and because DIOphane is enormously strong for its weight and thickness. Made in a number of types, there is a DIOphane film just right for packaging your product.*

SELECT *because DIOphane's glitter and sparkle have a magic effect on people's impulse to buy; because its standard range of brilliant colours and vivid multicolour printing make it the finest material in the world for making the eye-catching pack.*

SEEN *because DIOphane cellulose film is 95% transparent—more so even than window glass which is normally about 90% transparent. Your customers can carefully examine your product yet it remains as fresh and clean as when it left your factory.*

DIOphane CELLULOSE FILM means Buy Again

and because your sales increase, DIOphane pays for itself!

TYPES OF DIOPHANE

CODE	TYPE OF FILM	PROPERTIES	SUITABLE FOR	SEALING METHOD
P.T.	Plain (non-moisture-proof) Transparent	Transparent, proof against dust, air, oil, grease and handling	General wrapping including cereals—rice, tapioca, macaroni, etc. and foodstuffs requiring permeable wrapping: soap, cosmetics, bottles toys, textiles and paperware	Gum or gummed label Cellulose tape Wire staple Metal strip
P.C	Plain (non-moisture-proof) Coloured	As above, but coloured		
M.T.	Moistureproof Transparent	All properties of P.T. film, but also impervious to moisture vapour	Products needing protection against moisture or loss of moisture including biscuits, confectionery, cakes pharmaceuticals, cigarettes, dried fruits and metal parts	Special gum or gummed label Cellulose tape Wire staple Metal strip
M.C.	Moistureproof coloured	As above, but coloured		
M.T.T.W.	Moistureproof Transparent Twistwrap	As M.T. film, but with greater flexibility	Twist wrapping confectionery	Twistwrapping by machine
M.S.T.	Moistureproof Heatsealing Transparent	As M.T. film, but can be heatsealed	Same products as listed under M.T. film. Sometimes unsuitable for products which require to be wrapped when hot	Special gum or gummed label Cellulose tape Wire staple Metal strip Heatsealing
M.S.C.	Moistureproof Heatsealing Coloured	As above, but coloured		
M.S.A.T.	Moistureproof Heatsealing Anchored Transparent (waterproof)	Transparent, waterproof and heatsealing, the waterproof coating being anchored to the base film	Syrupy and sticky products such as dates and table jellies and those likely to be in contact with water such as quick-frozen products	
L.S.A.T.	Lacquered Sealing Anchored Transparent	Transparent and heatsealing. Coated on both sides with a lacquer (semi-permeable to moisture vapour) anchored to the base film	Cakes, sausages, bacon, green vegetables, fresh fruits, and any products that require to breathe	

SPECIAL TYPES OF DIOPHANE CAN ALSO BE MADE FOR SPECIFIC REQUIREMENTS

SEND US YOUR ENQUIRIES; WRITE OR PHONE TODAY TO DEPARTMENT 20

T.P.L

Agents throughout the world

TRANSPARENT PAPER LIMITED

HALIFAX HOUSE, 51/55 STRAND LONDON, W.C.2.

Telephone: Trafalgar 4311 Telegrams: Transpaper, Rand, London Cables. Transpaper, London

Visit our Stand No. 39, First Floor, National Hall, at the Bakers' and Confectioners' Exhibition at Olympia, 1 - 6 October.

IF YOU WANT REGULAR DELIVERIES

YOU WANT

Velvetone

(Regd.)

To keep regular quantities of the new Malteser boxes moving through the Mars factory is no problem for Hunt Partners. Supplies are kept to schedule by using their own VELVETONE process which is perfectly suited to long, fast, and frequent runs in exacting colour work.

Multiple colours can be used, and the machines are suitable for producing practically any size and shape of carton and greaseproof or laminated for long runs.

Small alterations or additions to a main design can be made during a contract, thus reducing stocks held to a minimum.

Cartons are precision cut, and so can be machined packed at speed.

Velvetone

may well be the answer to one of your biggest headaches. Why not contact Hunt Partners for further information?

HUNT PARTNERS LIMITED

Folding and Rigid Boxes Designed and Printed by Every Modern Method

Head Office: CLAPTON, LONDON, E.5
Phone: AMHerst 3388

Also at BRYNMENYN, S. WALES
Phone: Aberkenfig 367

MADE TO MEASURE

Kegs, Flat and Taper-top Drums and all types of Tin Plate Containers.

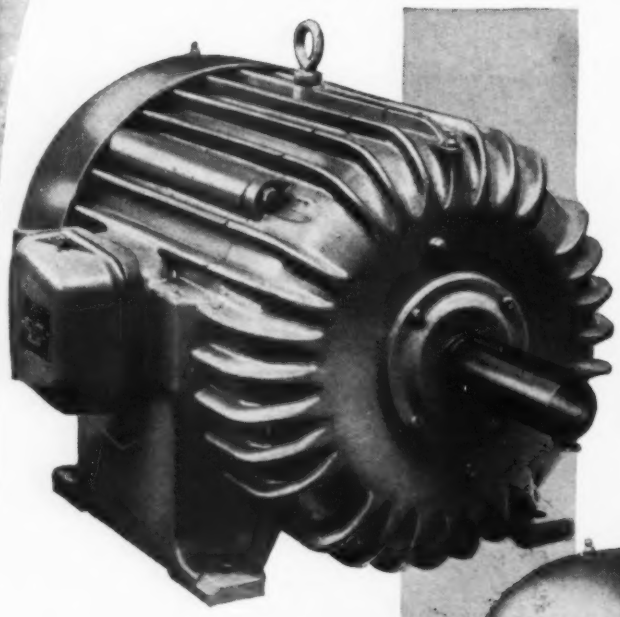
JOHN FEAVER

CONTAINERS MADE TO YOUR REQUIREMENTS

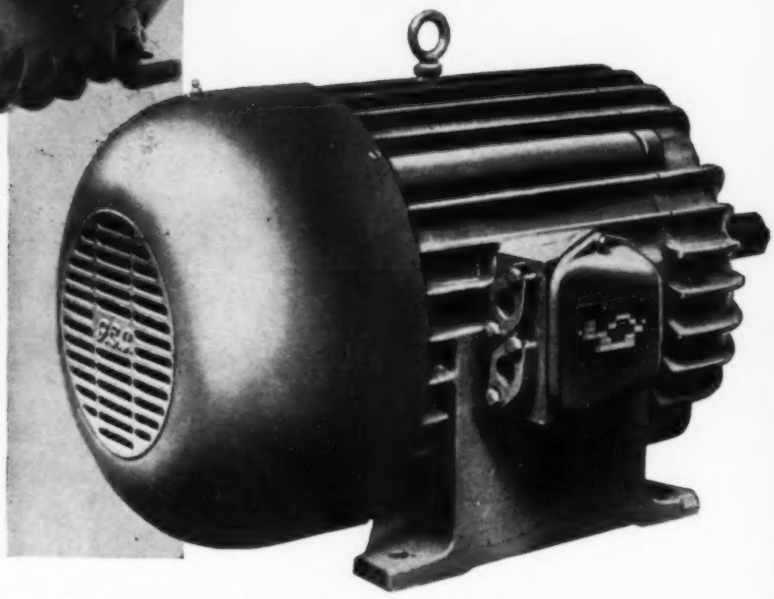
JOHN FEAVER LTD., 120 TOWER BRIDGE ROAD, LONDON, S.E.1

Telephone: BERmondsey 1753 *Telegrams:* Tinplate, Souphone, London

Built to last!



G.E.C. MOTORS



STANDARDISED DIMENSIONS TO B.S. 2083 (1954)

AVAILABLE FROM STOCK

TOTALLY ENCLOSED FAN COOLED

END WINDINGS TAPED TO GIVE INTER-PHASE INSULATION AND RIGIDITY

SIX LEADS BROUGHT OUT TO TERMINAL BOX

OUTPUT UP TO 25 h.p.

DOUBLE IMPREGNATION

FOR NORMAL DUTY IN ANY PART OF THE WORLD

BACKED BY 50 YEARS EXPERIENCE

Ask for Technical Description No. 431

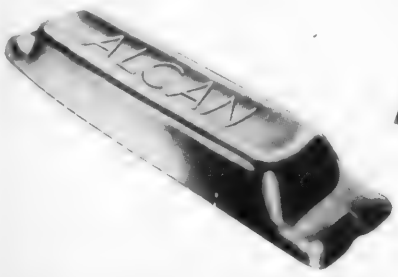
THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

ALUMINIUM AT WORK

From the familiar . . . . . to the less familiar

Good health largely depends upon hygiene. When hygiene is mentioned, aluminium comes to mind immediately . . . from pressure cookers to milking machines. Aluminium is so easy to clean, so easy to handle, stands up to hard wear. No wonder it is being put to work in the dairy industry. For example, aluminium sheet and castings are used in the construction of portable milking units and other dairy equipment such as buckets, coolers and strainers. Milk demands the highest standard of hygiene. The clean, smooth, bright surface of aluminium protects milk from bacterial dangers. Pause to consider—are you making the fullest use of aluminium?

Aluminium ingot, produced by Aluminum Company of Canada Ltd., is marketed by Aluminium Union Limited. In addition, the Company exports the products of the various fabricating companies of the Aluminium Limited Group.



Aluminium Union Limited

(Incorporated in Canada)

THE ADELPHI, JOHN ADAM STREET, LONDON, W.C.2.

OFFICES, ASSOCIATED COMPANIES AND AGENTS THROUGHOUT THE WORLD.

27

An ALUMINIUM LIMITED Company.

NEW! COMMER

'SUPERPOISE'

2-5 TON PETROL AND DIESEL TRUCKS

DESIGNED for economy, built for reliability, the new range of Commer 2-3, 3-4 and 5 ton trucks embody insulated three-seater cabs of welded steel. New steering and improved suspension add to the merits of a well-proved chassis; a range of factory-built bodies containing a high proportion of steel is offered, as well as an optional overdrive for extra economy. It will pay you to try COMMER before you buy!

WITH 'FULL-VIEW'
3-SEAT COMFORT CAB
& OPTIONAL OVERDRIVE

TOUGH! RELIABLE! SAFE! ECONOMICAL!

PRODUCTS OF THE ROOTES GROUP

COMMER CARS LIMITED LUTON EXPORT DIVISION · ROOTES LIMITED DEVONSHIRE HOUSE PICCADILLY LONDON W.1

Reduced heat fatigue increased production at

JACOB'S (L'POOL) LTD.

UNNECESSARY FATIGUE and loss of production were caused by radiant heat and excessively high air temperatures in the Wafer Department at W. & R. Jacob & Co. (L'pool) Ltd. Colts were consulted and a detailed ventilation survey proved that whilst more than sufficient extract ventilation already existed, this was unable to function properly owing to inadequate inlet air supplies. Five Colt Inflow Units were recommended as these would supply the inlet air necessary whilst at the same time the main cooling effects of the air movement provided would off-set the discomfort caused by radiant heat.

This is the most recent of nine separate Colt Ventilation contracts so far completed for this company, all of which have been highly satisfactory.

FREE MANUAL with full specifications of the wide range of Colt Ventilators is available on request from Dept. S38/269

COLT

VENTILATION

COLT VENTILATION LTD. SURBITON • SURREY

Telephone: ELMbridge 6511-5

Branches at Birmingham, Bradford, Bridgend (Glam.), Bristol, Coventry, Dublin, Edinburgh, Liverpool, London, Manchester, Newcastle-upon-Tyne, Sheffield and Warwick

Agents in America, Australia, Belgian Congo, Canada, Cyprus, India, Indonesia, Madagascar, Malaya, Mauritius, New Zealand, Pakistan, Portugal North and South Rhodesia and South Africa.

GREAT-GRANDFATHER SPEAKS HIS MIND

"So you're throwing away the coal shovel, m'boy?"

Great-Grandfather would certainly think that the country had gone to the dogs if he knew what industry was having to pay for its coal.

PROCEEDING, GREAT-GRANDFATHER SAID:

"Well, I suppose I can't blame you if you think it better to burn oil on the plant now. But I must say it seems odd that we can't get enough of our one source of national wealth and have to pay for this new-fangled fuel from abroad.

"I suppose you know all the technical difficulties? Which grade to use, whether one kind is cheaper than the other—the suppliers will tell you that, of course. But I see that the Spirax-people have got together some data that may be useful to you. Something about heat loss in tanks and pipe lines, flame fading, tracer line control, branch line heater temperatures and so on. Better send for it."

SPIRAX-SARCO STEAM-CONTROL

SPIRAX-SARCO LTD., CHELTENHAM, Glos. *Phone: Cheltenham 5175-76 Grams: Spirax, Cheltenham*
LONDON OFFICE: 28 Victoria Street, S.W.1. *Abbey* 6101-3832

---REQUEST SLIP FOR FURTHER INFORMATION---

To SPIRAX-SARCO LTD., CHELTENHAM, Glos.

Please send details of Oil Fuel Burning Installations Information Sheet No. 13.

NAME:

ADDRESS:

FM1055

PUT AWAY THAT COIN!

That's no way to plan a lighting installation!

Nothing must be left to chance . . . type of fitting, spacing, mounting . . . quality of distribution . . . total wattage, and individual lighting points.

We'd like to show you the way *we* go about a job.

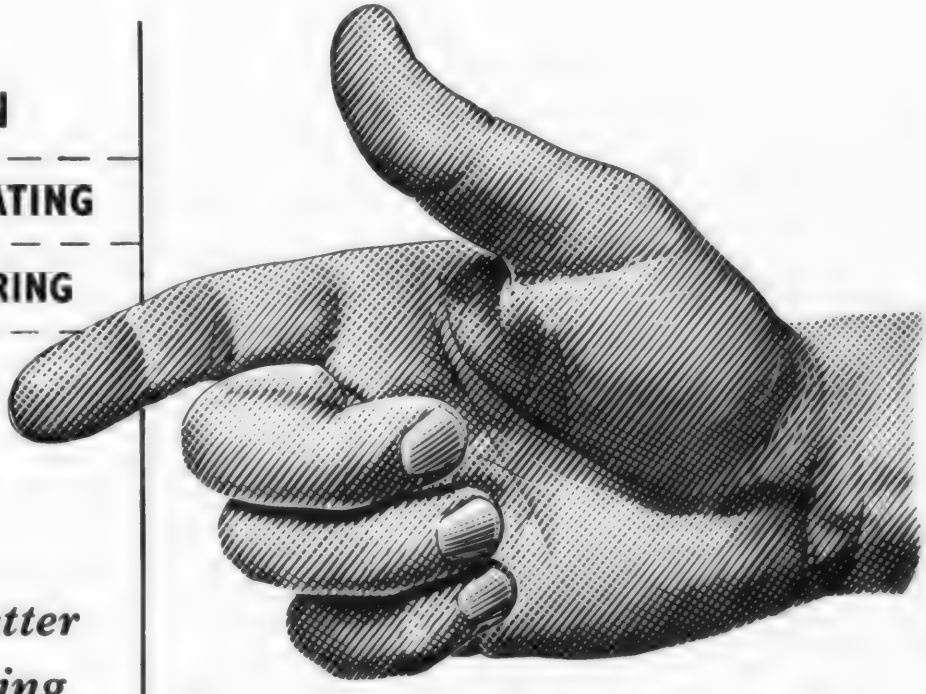
We'd like to show you some lighting specifications we have prepared. Please call us in and talk it over.

BENJAMIN

ILLUMINATING

ENGINEERING

SERVICE



better lighting by

BENJAMIN REGD.

REMEMBER POPPY DAY

THE BENJAMIN ELECTRIC LTD. TOTTENHAM · LONDON N.17

Telephone: TOTtenham 5252 (5 lines) *Cables: 'Benjalect, Southtot, London'*

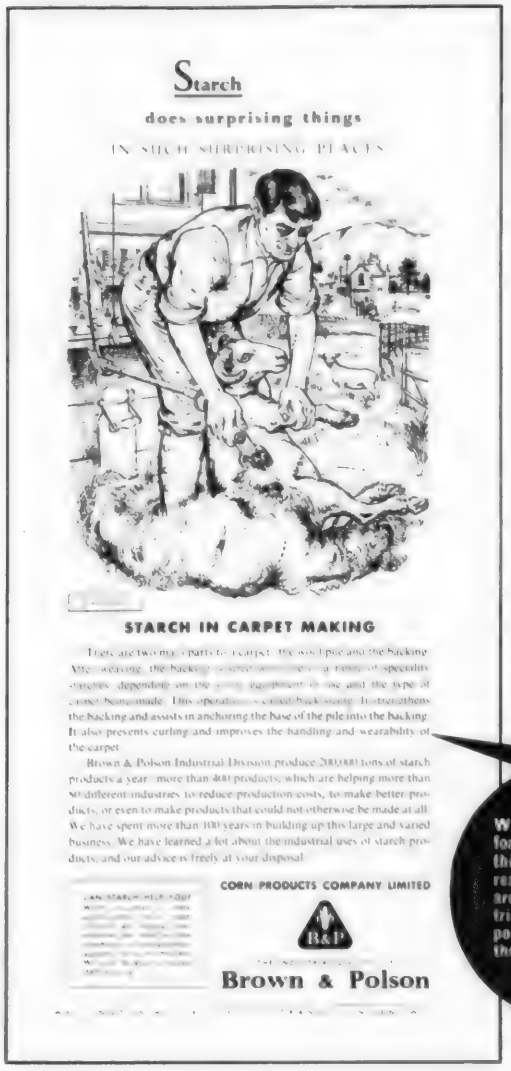
BIRMINGHAM: 5 CORPORATION STREET, BIRMINGHAM, 2. Tel: MIDland 5197 · LEEDS: 49 BASINGHALL STREET, LEEDS, 1. Tel: Leeds 25579

Smee 1 55

FOR 80 INDUSTRIES

More than
400
Brown & Polson
Starch
Products

The deep knowledge and wide practical experience we have gained by our huge and varied production for other industries is your guarantee that our starch products for the preserving industry will always be the best that can be made. And we can promise you knowledgeable and disinterested advice whenever you care to discuss with us proposed new uses for starch products in your business.

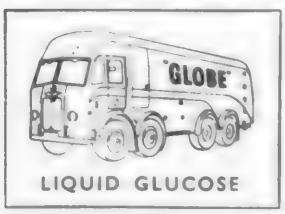


Watch the National press for advertisements like this one. When you read how starch products are helping other industries you may see new possibilities of turning them to account in your own business.

for you, in the Preserving Industry

Most jam manufacturers have encountered the problem of making jams that contain enough soluble solids to be satisfactory in quality, yet are not too sweet for their customers' taste and will not crystallise in storage. Most jam manufacturers are also aware that the best answer to this problem is to use less cane or beet sugar (sucrose) in their jams and make up the required soluble solids content with " Globe " liquid glucose. Glucose provides abundant food energy but is not as sweet as sucrose. When glucose is used in jam making to replace some of the sucrose it reduces excessive sweetness without reducing food value; it brings out the natural flavour of the fruit; it helps the jam to set; and it prevents crystallisation.

" Globe " liquid glucose is made from starch by Corn Products Company Limited—the Industrial Division of Brown & Polson—and we make the starch, too. Our careful control of every manufacturing process from the grain to the finished product is your assurance of the quality and purity you require in your preserves.



CORN PRODUCTS COMPANY LIMITED

THE INDUSTRIAL DIVISION OF B&P Brown & Polson

WELLINGTON HOUSE, 125-130 STRAND, LONDON, W.C.1

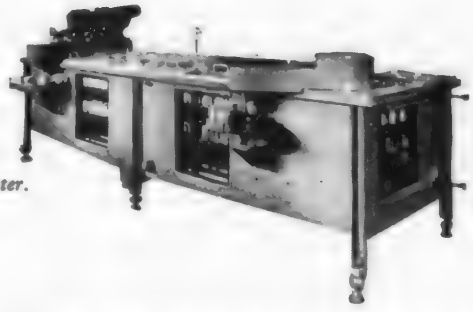
Let G.C. handle it

We specialise in the manufacture of plant that will speed the flow of your materials and increase output. Our equipment for more efficient handling includes food processing plant, can-handling plant, friction and bar elevators and cable conveyors.

Consult us on your particular requirements.

Gooseneck elevator.

Rod washer.



Two tier exhauster.

OF THE WIDE RANGE OF

BRABY

PRODUCTS

FREDERICK BRABY & CO., LTD.

G. C. Engineering Division

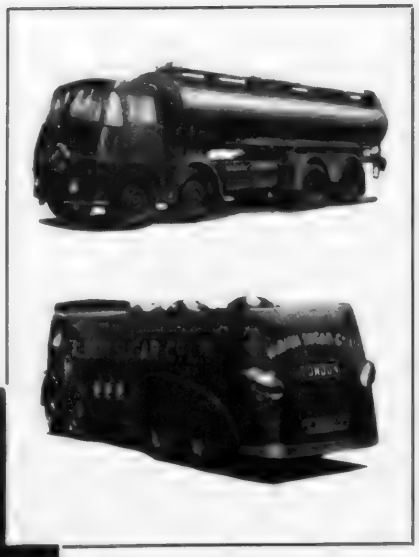
London Works, Thames Road, Crayford, Kent *Telephone: Bexleyheath* 7777

(Successors to the G. C. Engineering Co. Ltd., Deptford, S.E.8.)

At Butterfields

Department 108

says ROAD TANKS



Fabricated to your plant engineer's specification and insulated as required

STAINLESS STEEL · MILD STEEL · ALUMINIUM

Our photograph gives the impression of monumental calm only because the camera asked for it. During working hours it's a hive of activity, a self-contained Road Tank factory a hundred yards long, complete with portable Vacu-Blast equipment for shot-blasting on exterior or interior surfaces, and with manipulators for positioning Tanks for down-hand welding, together with equipment for all the latest methods of welding Stainless Steel, Mild Steel and Aluminium. Calibrating according to latest techniques.

Butterfield
ROAD TANKS

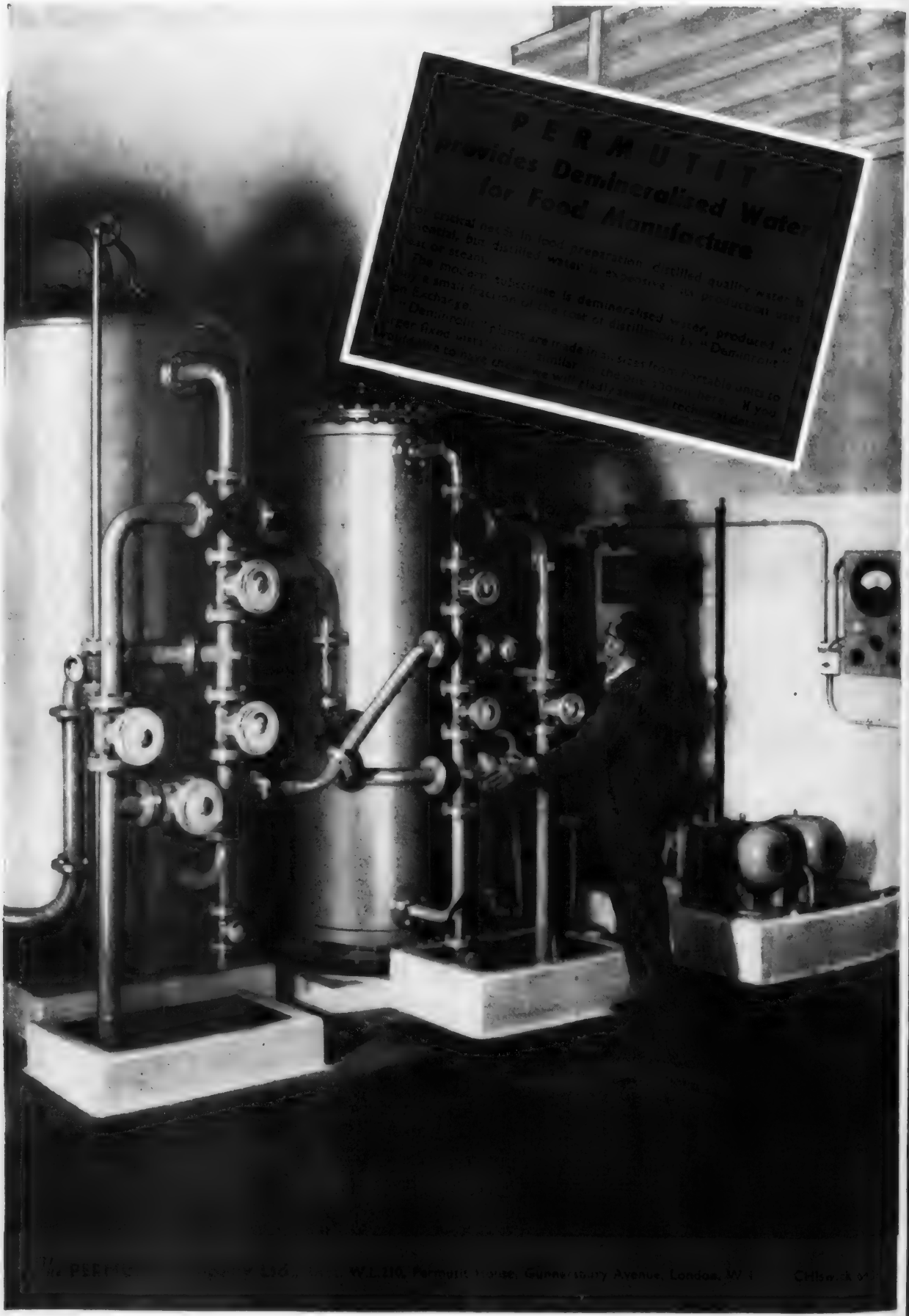
Girder mounting ensures stability

W P BUTTERFIELD LIMITED PO BOX 38 SHIPLEY YORKSHIRE Tel 52244 (8 lines)

Rayner's

essences and colourings
known for over
100 years as the best

RAYNER & CO., LTD., LONDON N.18


PERMUTIT
provides Demineralised Water
for Food Manufacture

APPLIED EXPERIENCE

WHEN British Cellophane Limited sells a roll of film — it may be "Cellophane" cellulose film, B.C.L. polythene or Courtaulds' cellulose acetate —the company is, nine times out of ten, indirectly involved in the sale of someone else's product as well. This is true of all packaging materials. It is especially true of those which face the final, searching test in the shops.

This is where the services of British Cellophane Limited come in. No producer of merchandise can employ a staff qualified in *all* aspects of the highly-specialised business of packaging. But he can do the next best thing—call upon the unrivalled knowledge and experience of the B.C.L. organisation's team of packaging specialists, scientists, engineers and designers.

British Cellophane Limited has behind it a wealth of packaging knowledge collected from its agents and associates in 47 countries. At home, the company is constantly adding to its considerable experience which embraces the packaging of every type of consumer product — from fresh meat to household textiles.

This unique organisation exists for a single purpose — to help the user of packaging films to get the best possible results from them.

With its ready assistance and advice, British Cellophane Limited is making a positive contribution to better packaging. And today, more than ever before, good packaging means good business.

AND NOW . . . COLODENSE

COLODENSE LIMITED, leading converters and high-quality printers of transparent cellulose film, are now a wholly-owned associate of British Cellophane Limited. More power to the B.C.L. film-user! Whether he needs "Cellophane" in rolls, in sheets, in bags, unprinted or printed in one colour . . . or printed in five colours . . . for wet or dry products . . . for frozen foods or fabrics . . . the B.C.L. organisation can supply it.

"CELLOPHANE" — the first packaging film — and the greatest!

BRITISH CELLOPHANE LIMITED

Commercial Offices: 12/13, CONDUIT STREET, LONDON W.1

Reg. Offices and Factory: BATH ROAD, BRIDGWATER, SOMERSET

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them

MALT EXTRACT

DRIED MALT EXTRACT POWDER

MALT FLOUR

An ever-increasing application to food industries

EDWARD FISON LIMITED

FACTORY CEDARS · STOWMARKET · SUFFOLK

Maltsters for more than a Century

Rippatape

TRADE MARK

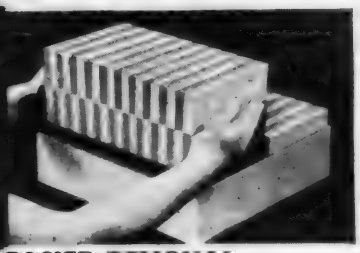
Quick-Tear

Rippatape

Paynes

is a new method of quick and easy opening of containers

EASIER MARKING



EASIER REMOVAL

HANDY RE-USE OF CONTAINERS

Pull Tear-Tab on Container Wall and "zip" its open ...

P. P. PAYNE & SONS LIMITED

HEAD OFFICE & FACTORIES
HAYDN ROAD, NOTTINGHAM
Telephone: NOTTINGHAM 66648

LONDON OFFICE & SHOWROOMS
BUSH HOUSE, LONDON W.C.2
Telephone: TEMPLE BAR 5964

COMPANIES OVERSEAS

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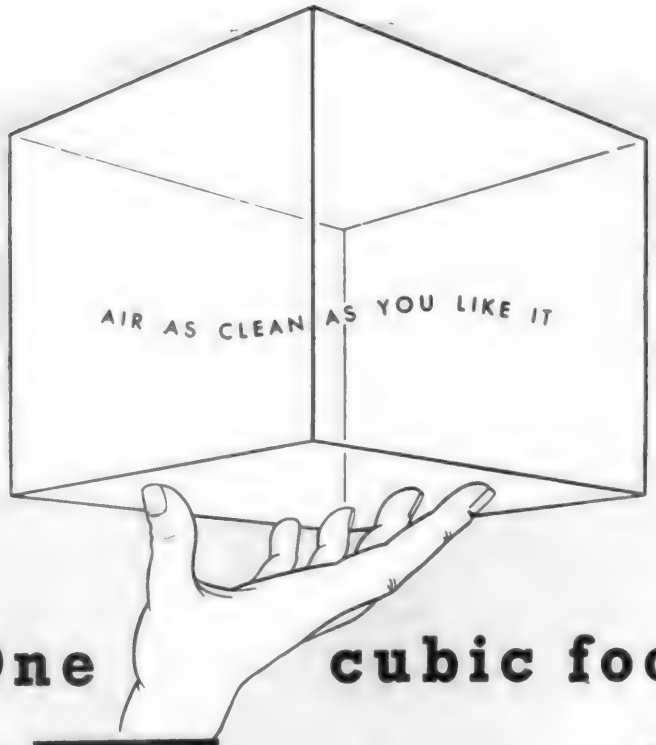
468 King Street West, Toronto 2B.
Ontario, Canada.

P. P. Payne & Sons (South Africa) Ltd.,
404/5 Safric House,
Corner Eloff & Plein Streets,
Johannesburg, South Africa.

P. P. Payne & Sons (Australia) Ltd.,
545 Pacific Highway,
Crows Nest, N.S.W.
Australia.



We can supply air filters for the Food Industry to fit into every type and size of scheme. Our range is the most comprehensive available from one single manufacturer — and each filter is the leader in its particular field.

Below are brief details of our filter range. Why not write to-day for fuller information?

One cubic foot..

..or a million

AAF

Exclusive Manufacturing Licensee
AMERICAN AIR FILTER CO. INC.

PL-24

A dry filter employing an inexpensive throw-away medium. Compact; easy to maintain.

ELECTRO-PL

A dry type electronic precipitator of similar constructional design to the PL-24.

ELECTRO-KLEAN

A compact electronic filter for the smaller installation.

MULTI-DUTY

A positive self-cleaning viscous impingement filter with very high efficiency.

AIRMAT

A pocket type industrial filter employing various types of filtering media to suit conditions.

DUSTRAP

A complete range of throw-away and cleanable filters in standard size frames employing glass wool, wire wool and synthetic fibres as filtering media.

L.F.O.

A viscous impingement type filter for manual cleaning.

CYCOIL

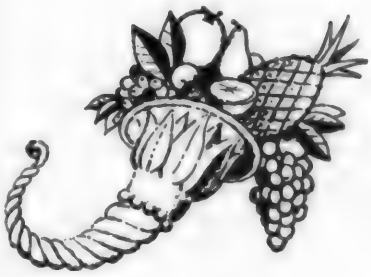
A compact filter combining centrifugal separation and viscous impingement, specially developed for compressed air and large diesel engines.

ACI LTD.

Air Control Installations Ltd

RUISLIP · MIDDLESEX · Ruislip 4066 (8 lines)

BIRMINGHAM	MANCHESTER	NEWCASTLE-ON-TYNE	GLASGOW
MIDLAND	CENTRAL	WHITLEY BAY	CENTRAL
1165 & 1367	0679 & 0670	23046	2923



Vantoc AL

A reliable steriliser

Vantoc AL is of interest to all manufacturers of soft drinks. It is a surface-active quaternary ammonium bactericide. It penetrates and destroys infection in mixing pans, syrupers, pipe lines, fillers and bottle stoppers. Its solutions, which may be applied hot or cold, are odourless, non-corrosive, non-toxic and safe to handle. Vantoc AL is highly effective against yeasts and a wide range of bacteria at the concentrations recommended.

Write for 'Surface Active Agents Leaflets' No. 6 and No. 22.

IMPERIAL CHEMICAL INDUSTRIES LTD LONDON SWI

ICI

D-543

Regular Polygons!

Nonagon, decagon . . . many-sided might well describe the versatility of the packaging demands on Medway Corrugated Cases. Each one is skilfully designed on a tailor-made principle to provide protection for its contents against the hazards of all forms of transportation. The skill manifests itself in the way the cases are constructed from tough corrugated board, making the most of the cushioning thus provided. Some ingenious styles are evolved, but with all their intricacies they make easy-to-assemble units and simplify the packer's job. Regular polygons! Regular teasers too, sometimes, but each case is planned to ensure that the "factory finish" of the contents is retained after journeying by road, rail, sea or air.

THE CASE FOR BETTER PACKAGING

THE MEDWAY CORRUGATED PAPER CO. LTD., NEWHYTHE, MAIDSTONE, KENT Reed

London Sales Office: Blackfriars House, New Bridge Street, London, E.C.4

CLIFFS
FOOD PRODUCTS
LTD

DIRECTORS
E. MORRELL
S. J. MORRELL

TELEPHONE
SIMONSWOOD
2605 & 2692
TELEGRAMS
SHOWBRAND
KIRKBY
LIVERPOOL

LEES ROAD
KIRKBY TRADING ESTATE
LIVERPOOL

Our ref:
TGH/OB.

27th May, 1955.

Contracts Manager,
Electrolux Ltd.,
Regent Street,
LONDON, W.1.

Dear Sir,

We have now had your Laundry Equipment at our factory for the past four months, and its installation has greatly contributed to the maintenance of a high standard of cleanliness. It enables the speedy and efficient laundering of overalls, etc., and we are pleased to inform you that it has been most satisfactory in all respects. We would also express our appreciation ofthe helpful advice and training which you gave to our operators of this equipment.

Yours faithfully,
p.p. CLIFFS FOOD PRODUCTS LTD.

J. G. Hardman

Secretary.

Electrolux
LAUNDRY EQUIPMENT
washes "on the spot"

Electrolux Laundry Equipment — installed by Cliffs Food Products Ltd., Liverpool, is used for washing all factory garments—overalls, coats, aprons, caps and also boiler suits for maintenance staff etc. To provide a daily change of garments for about 120 personnel approx. 600 overalls, 400 aprons and 500 caps are washed weekly *on the spot*.

Electrolux Laundry Equipment (Washing Machine, Hydro-Extractor, Laundry Truck):

- provides a high temperature wash—at boiling-point if necessary.
- reduces handling.
- saves delay in turn-round of laundry.

Washing Machine handles 22 lb. dry weight in *one* operation. Heats its own water — by gas, electricity or steam. No additional water-heating plant needed.

Hydro-Extractor: capacity of 14½ lb. dry cloth weight. Greatly simplifies drying of clothes — removes most of the water in five minutes.

Laundry Truck: capacity 53 gallons. For soaking and transporting laundry from Washing Machine to Hydro-Extractor.

Electrolux Laundry Equipment is designed for heavy duty and long life . . . it is a sound investment.

For full details of the Electrolux Laundry Planning Service write to:

ELECTROLUX LTD. (Contracts Dept. G), 153 5 Regent Street, London, W.1. Telephone: REGent 7252

without question

Metal in your product is a serious matter endangering both you and your customers. No matter how much care is exercised in manufacture, it can still find its way into the finished product — unless, of course, you use CINTEL Metal Detectors. With unfailing accuracy and without human intervention, this equipment not only detects all articles containing metal, but automatically ejects them as well. Only CINTEL Detectors will ensure that your products are accepted without question.

Full details are available to you on request.

Cintel

CINEMA-TELEVISION Ltd.

WORSLEY BRIDGE ROAD · LONDON · SE26

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A Company within the J. Arthur Rank Organisation

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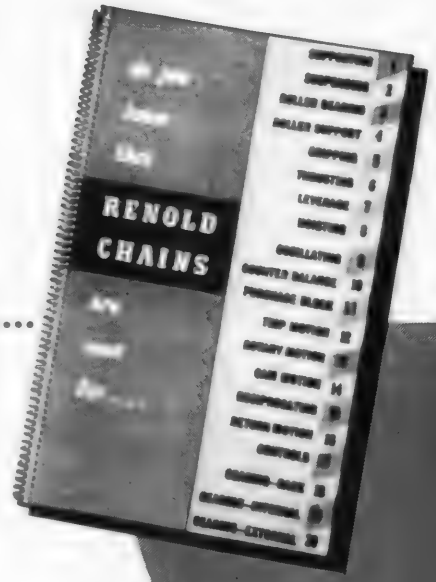
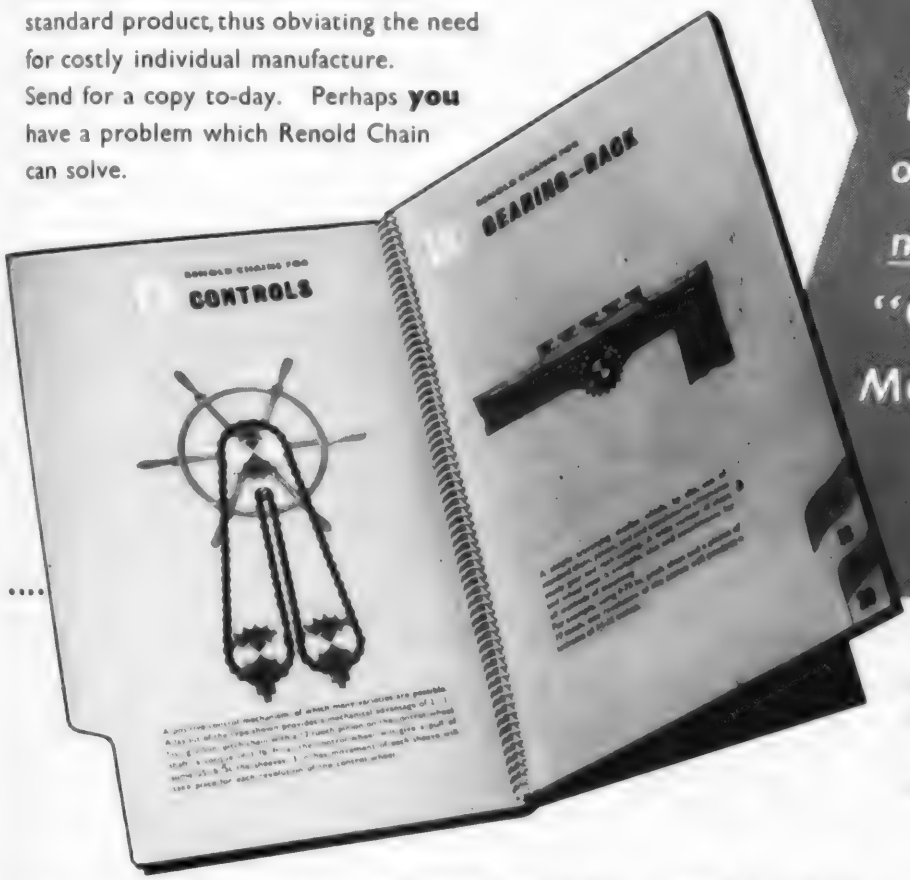


Frankly, we don't know: for, apart from the known field of power transmission, they can be used for an infinite variety of devices, motions and operations. This new booklet, "Chain Mechanisms", illustrates a few typical examples, all offering the advantages of a famous standard product, thus obviating the need for costly individual manufacture. Send for a copy to-day. Perhaps **you** have a problem which Renold Chain can solve.



Write for free copy of this new booklet, "Chain Mechanisms"

Invaluable to
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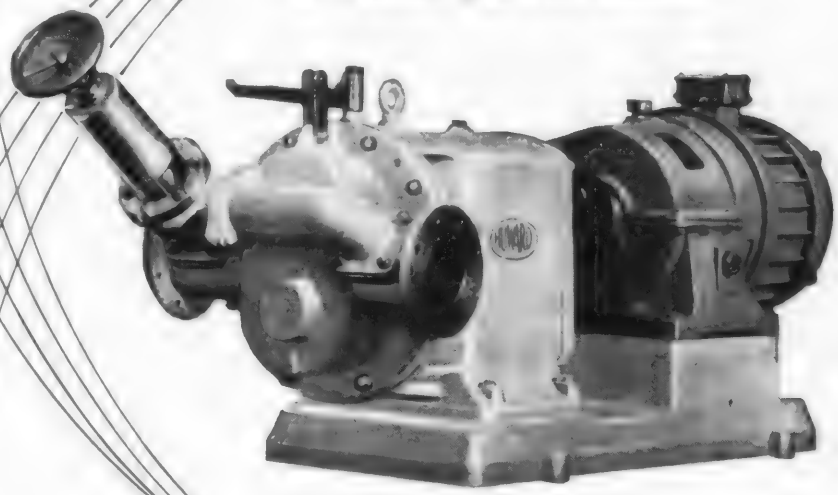
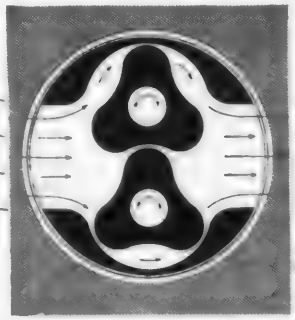


Long, steady, reliable performance under the hardest working conditions is what you get with the Howard M-Type Rotary Pump. It's strong and powerful in dealing with thick and viscous liquids, yet its superior streamline action also enables it to handle even the most delicate liquids without the slightest degree of agitation. The M-Type Rotary Pump is ideal for industries handling liquid foodstuffs and chemicals, no matter how high or low their viscosity. Its all stainless steel construction and foolproof design eliminates any possibility of corrosion or contamination. Maintenance and cleaning are very simple matters and the pump casing can be jacketed for heating purposes.



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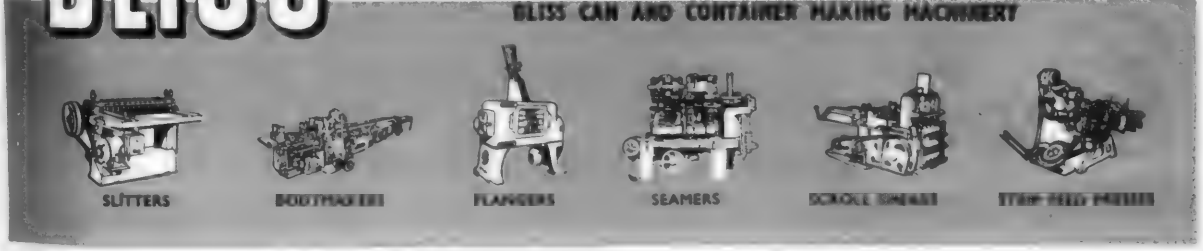

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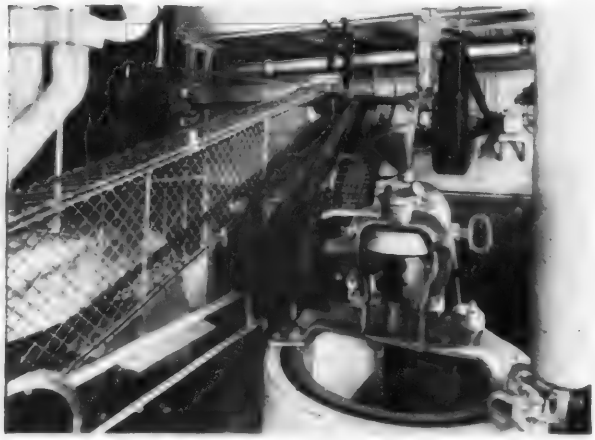
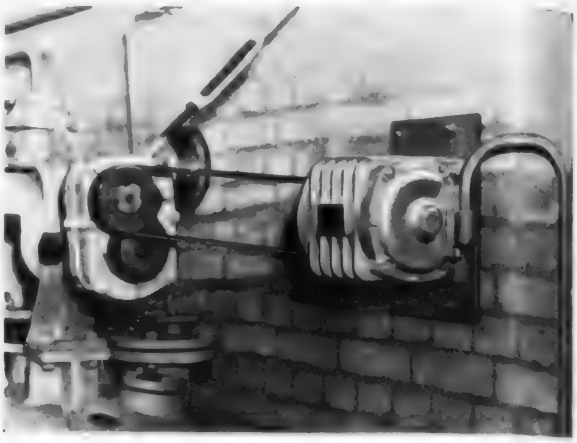


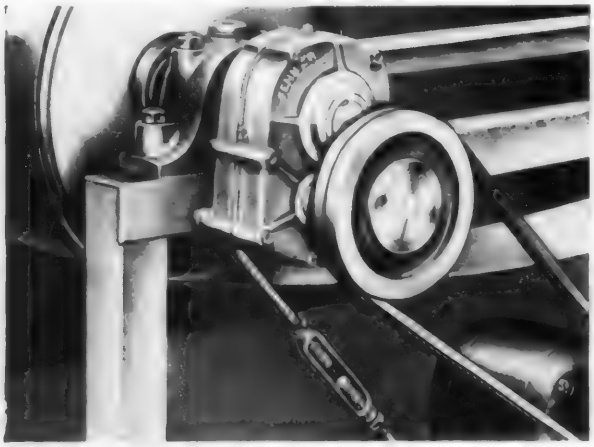
THE OLD METHOD.

A nationally famous firm of manufacturing chemists had the problem of driving chemical mixers at 60 r.p.m. A base mounted gear box was impractical and a cumbersome and expensive double reduction overhead drive had to be used.



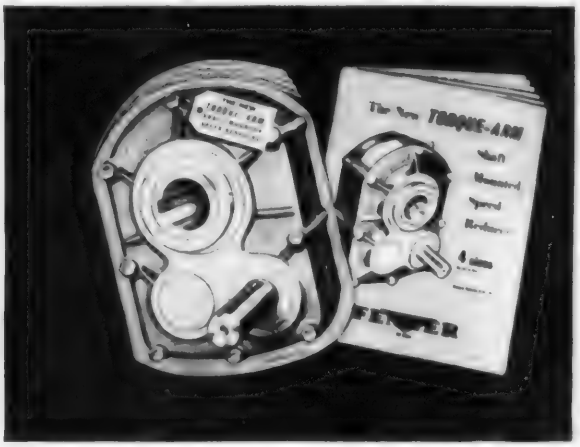
THE NEW METHOD.

A Torque-Arm shaft mounted speed reducer was installed on top of the mixer driven through a Taper-Lock V-Drive by a wall mounted motor. Advantages: clean safer drive, economy in space, simplified maintenance, more useful power transmitted.



TORQUE-ARM CAN HELP YOU TOO!—

Space limitations no longer prevent you installing a speed reducer. The Fenner Torque-Arm Reducer mounts direct on the driven shaft and can be driven through any V-Belt Drive. It delivers up to 97% of power to output shaft. No motor base or slide rails are required, no flexible couplings needed. It is suitable for the majority of slow speed drives.



TECHNICAL LITERATURE IS AVAILABLE.

Literature giving all the facts about Fenner Torque-Arm Speed Reducers is available . . . send for your copy TODAY. Fenner Technical Advisory Service will be glad to consider your Speed Reduction problems and advise on the suitable application of Torque-Arm Speed Reducers.

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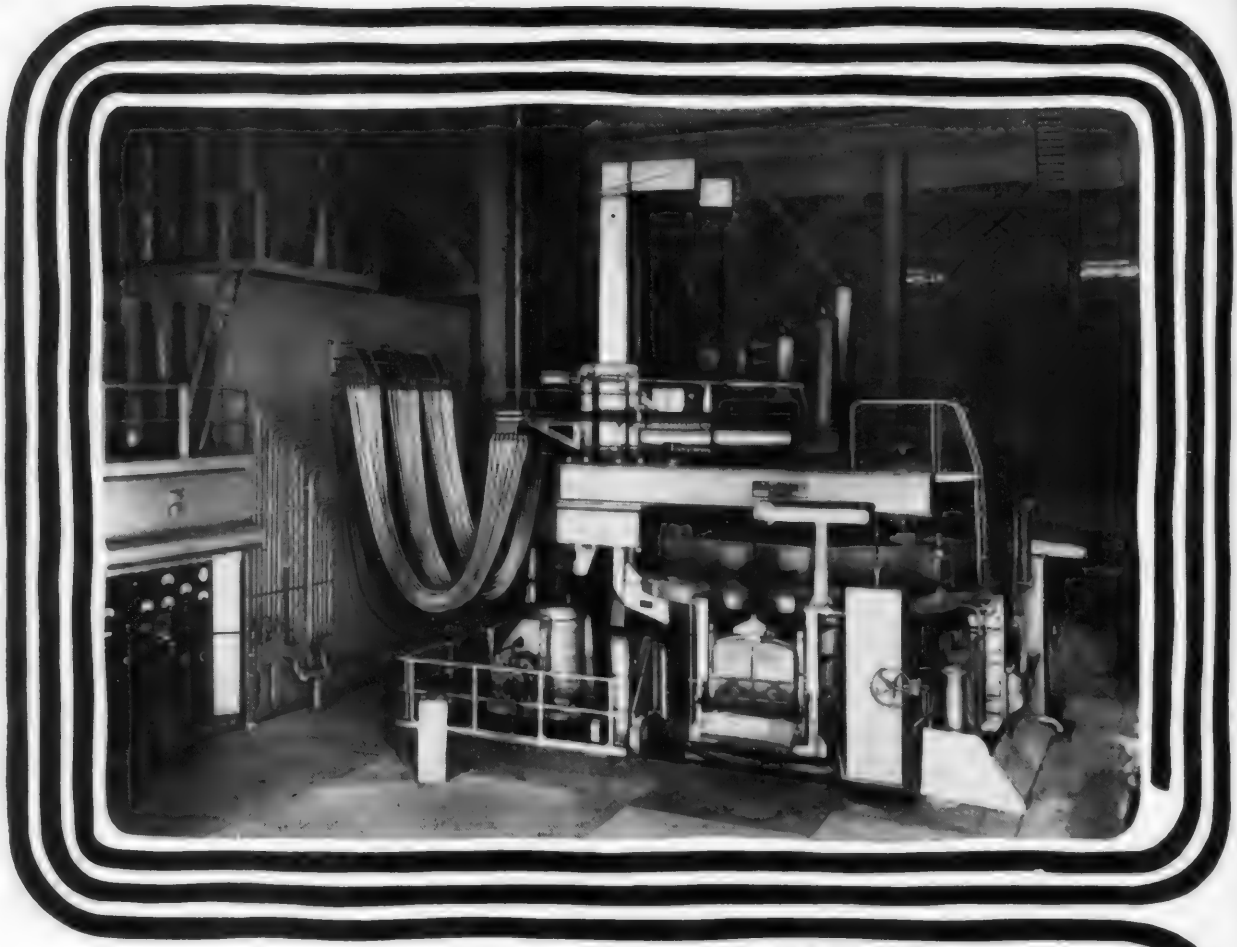


Having a hand in Productivity

In every industry or trade, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry — produced by the Electrical Development Association.

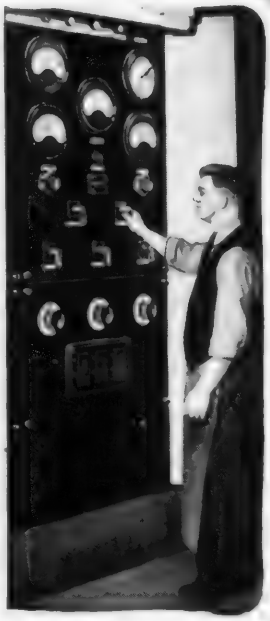
E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free) and the Electricity Boards (or E.D.A. themselves) can supply you.

The British Electrical Development Association,
2 Savoy Hill, London, W.C.2.

Steel-exactly!

The hand is on a lever, a small lever that is light to operate. But through that lever the hand is controlling the powerful current necessary to melt 20 tons of steel in an electric furnace. And because the furnace is electric the hand is doing much more than that. It is controlling the making of steel quickly, economically, exactly. Whether it be for production of exact-analysis steel or of cast iron from the lowest grade of scrap, there is nothing to beat the electric furnace. But the electric furnace is

only one of the aids to higher Productivity that Electricity can bring you.



Electricity a Power of Good for PRODUCTIVITY

If it's a matter of

keeping...

HOWARDS SORBITOL is a valuable humectant that has established itself in the confectionery trade and has applications in many branches of the food industry in which sugar-like substances are used.

Sorbitol keeps the goods from drying, improves the texture and preserves freshness. Its uses range from glacé fruits (as a softening agent) to tinned fruits when delicate flavours are likely to be masked by excessive sweetness.

It is compatible with most foodstuffs, and does not react with acids, flavours or colours. Its sweetness is about two thirds that of sugar, for which it can be used as a substitute by diabetics. The preservative action is similar to that of sugar but it is less affected by biochemical contamination.

Howards supply Sorbitol in two forms

SORBITOL SYRUP 70%(N/C)
non-crystallising syrup for use as a humectant.

SORBITOL CRYSTALLINE POWDER
for use where water content has to be low.

Working samples will be sent on request and Howards will be glad to advise on their use.

PHYSICAL PROPERTIES

1. *Taste — cool, sweet, and with pleasant after-taste.*
2. *Solubility of Sorbitol in water (Fig. 1). Tendency to supersaturate which is often useful.*
3. *Odour—Sorbitol has no odour.*
4. *Volatility—Sorbitol is non-volatile: solutions gain or lose water according to the conditions.*
5. *Specific gravity of Sorbitol solutions at 20°C. (Fig. 2)*
6. *Viscosity of aqueous solutions of Sorbitol, glycerol and corn syrup at 25°C. (Fig. 3). The viscosity at 70% is suitable for the usual mixing operations.*
7. *At certain concentrations it has similar preservative action to sugars but is less affected by biochemical contamination.*
8. *Sorbitol is an affective humectant, water being retained over a wide range of humidity and temperature.*

FIG. 1

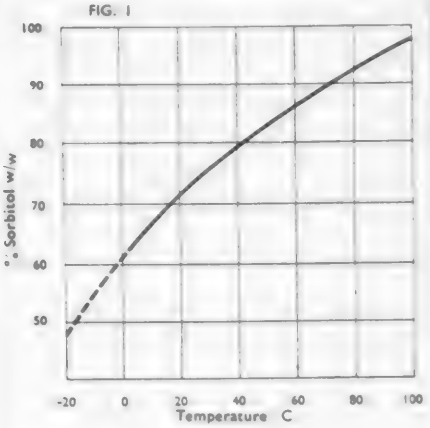


FIG. 2

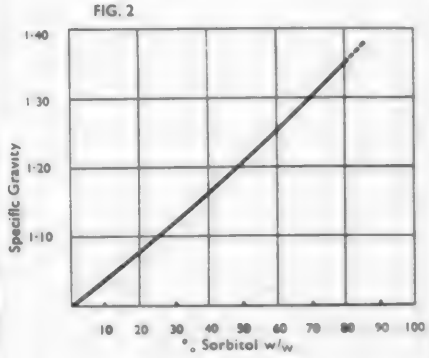
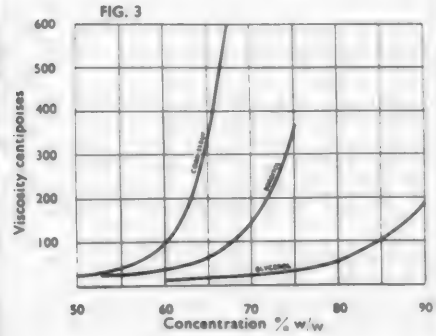


FIG. 3



HOWARDS

Sorbitol

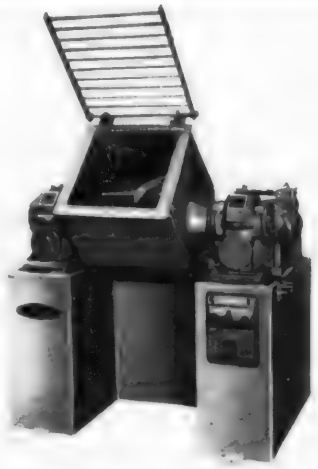
HOWARDS OF ILFORD LIMITED, ILFORD, ESSEX

Telephone: Ilford 3333

In a fix about a **mix?**

talk to **GARDNERS** of Gloucester

IF you've a mixing problem on your mind, why not talk to Gardners of Gloucester ? Whether it's a wet mix or a dry one, fine or coarse, whether you want to dry the materials as you mix or add flavouring or perfume at the same time, Gardners can supply the right machine. The wide range of standard machines has uses in industries ranging from food to fertilisers. And Gardners are always ready to design or modify any machine to suit your own special needs. Send along a sample for free test and confidential report.



The Gardner Double Arm Mixer

Specially suitable for mixing pastes and mixtures of a dough consistency and for handling thick creams which cannot be mixed in the ordinary Gardner Patent 'Rapid' Mixer. Mixing trough is arranged to be tipped for emptying. This is just one of the wide range of Gardner Mixers.

Send for the Gardner List giving details of 22 types of the very large range of sifting, mixing, drying and grinding machines.

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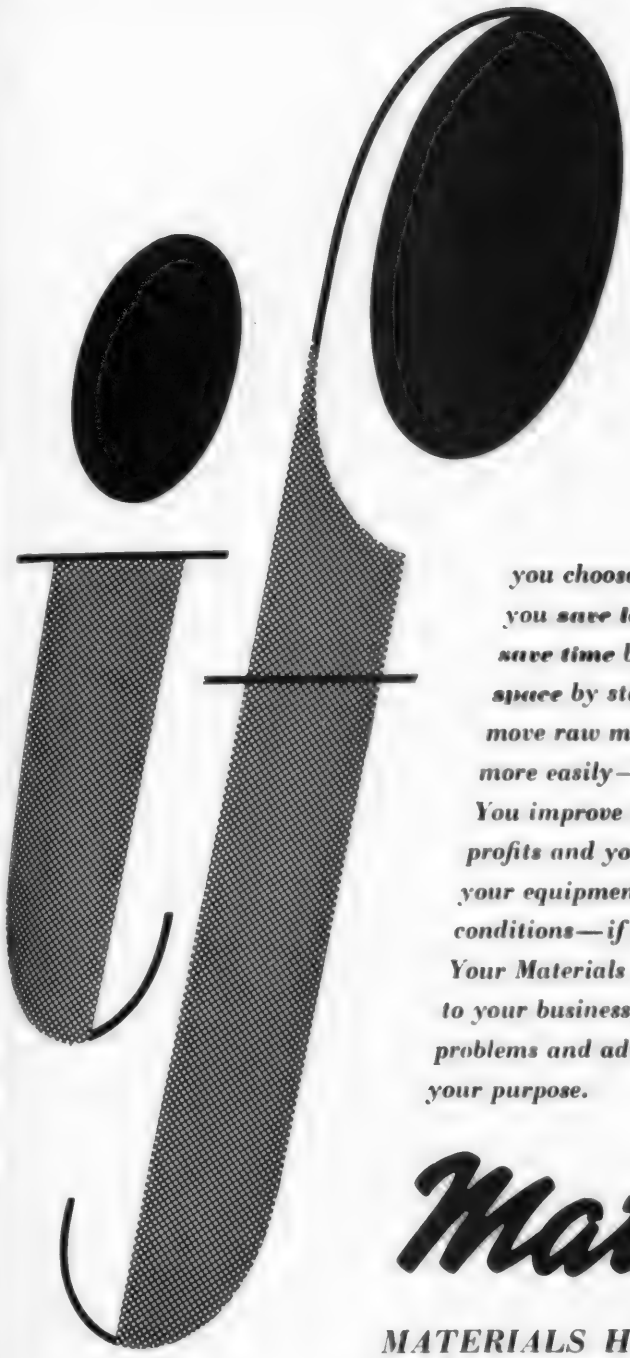

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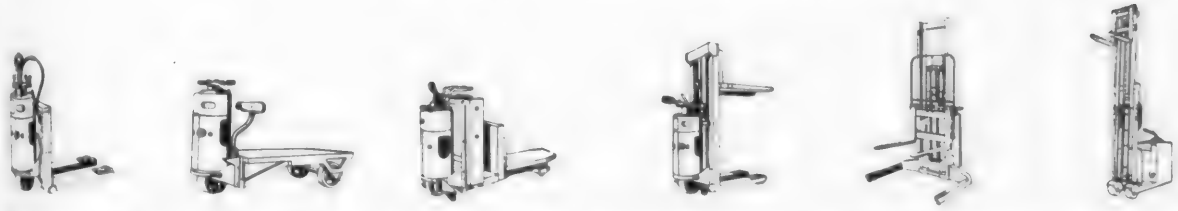

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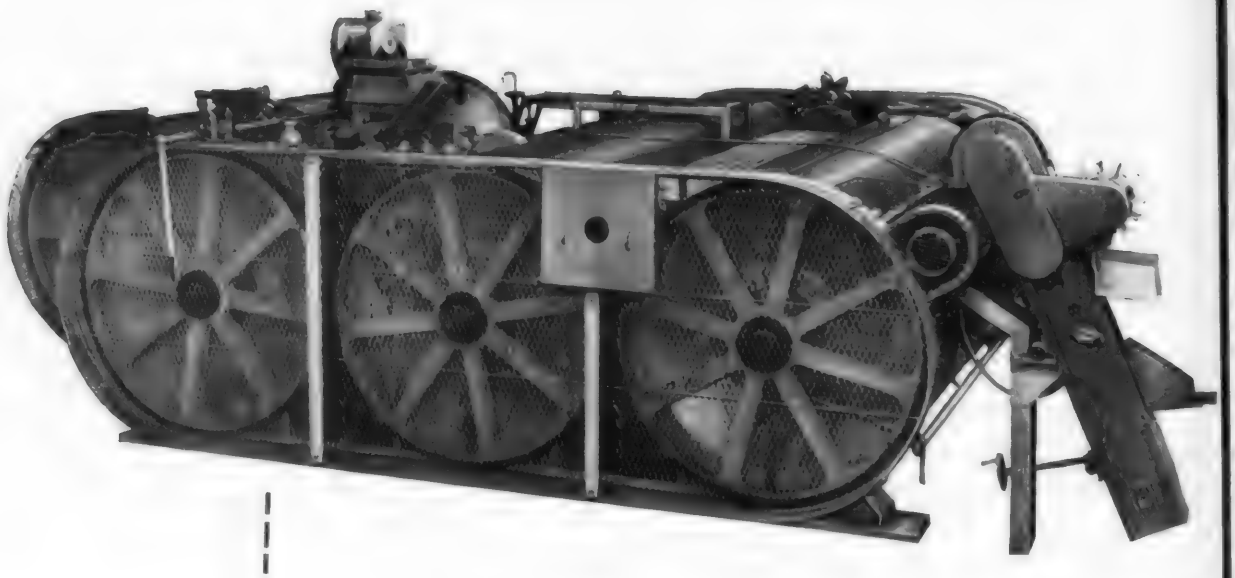

another British engineering triumph . .

The Mather & Platt

Rotary Sterilizer

The machine illustrated above was recently installed in a well-known British cannery, and has an output of 400 cans per minute at an approximate cooking time of 19 minutes.

Mather and Platt Ltd. can offer a complete range of continuous cookers, including the following:

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- Agitating Rotary Sterilizers.
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- Hydrostatic Cookers.

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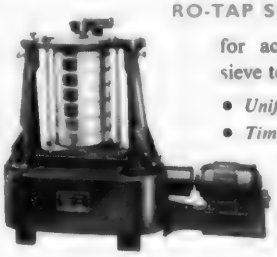

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for accurate and consistent sieve testing.

- *Uniform mechanical action.*
- *Time switch control.*
- *Accommodates up to thirteen 8" diameter sieves.*

SAMPLE SPLITTER—

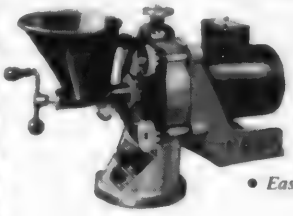
to reduce a large sample for making sieve tests.

- *Made in two sizes for heavy tinned steel.*
- *No. 1: Eighteen ½" openings.*
- *No. 2: Sixteen 1" openings.*
- *Both sizes discharge alternately in opposite directions.*

ROVAC LABORATORY FILTER—

complete working reproduction of larger machine.

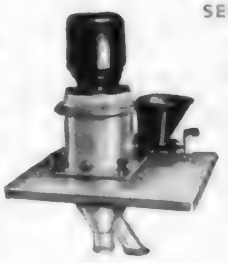
- *Built on cell principle: 3 sq. ft. filtering area.*
- *Belt drive, fast and loose pulleys.*



RAYMOND LABORATORY MILL—

grinding non-abrasive materials.

- *Rotor has eight steel swing hammers and runs at high speed.*
- *Supplied with five perforated steel screens, of different sizes, to suit product.*
- *Easily dismantled for cleaning.*



RAYMOND LABORATORY SEPARATOR—

self-contained air unit for dry particle size classification.

- *Separating chamber encloses all rotating parts.*
- *Simple to dismantle and clean. Fan and whizzer combination easily changed to suit product.*
- *Motor bearings grease-packed. No oiling required for separator parts.*

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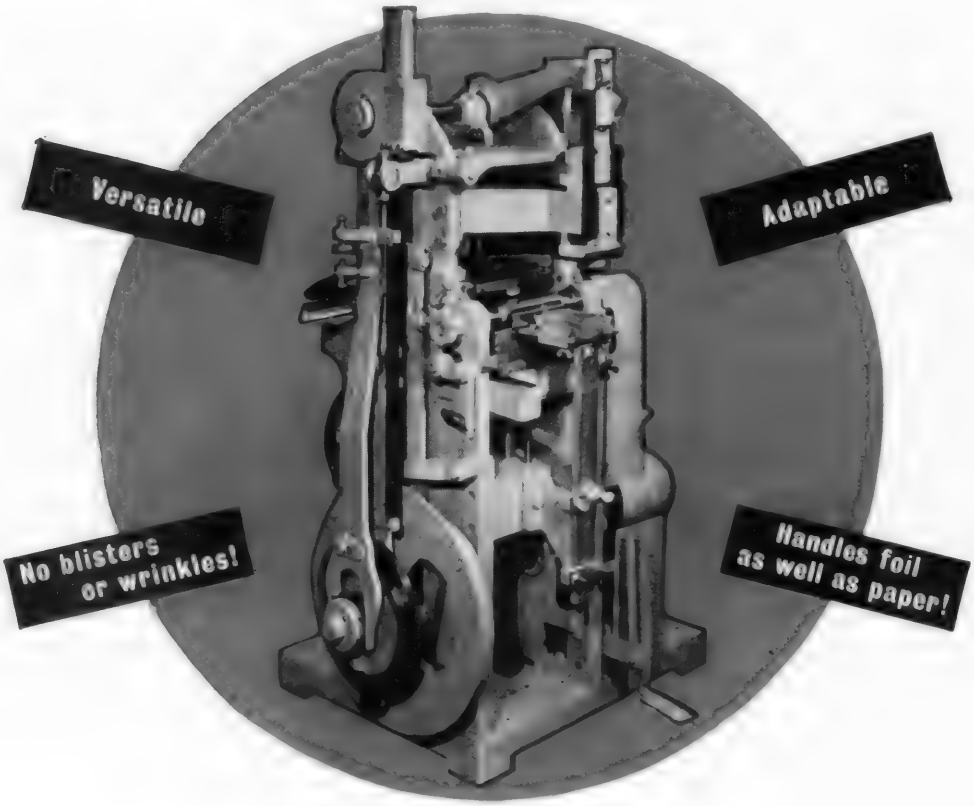
The result of more than thirty years steady development



The PONY LABELRITE Labelling Machine is able to perform a great diversity of labelling operations at speeds varying from 35 to 60 labels per minute. It can cope with an amazing variety of sizes and shapes, in plain, varnished, lacquered or foil labels. Another version of this famous machine is the PONY LABELDRI—the original THERMOPLASTIC Labelling Machine.

Enquiries respecting new Machines or Orders for Spares, and service facilities available for existing machines, should be addressed to:

Peters of Slough

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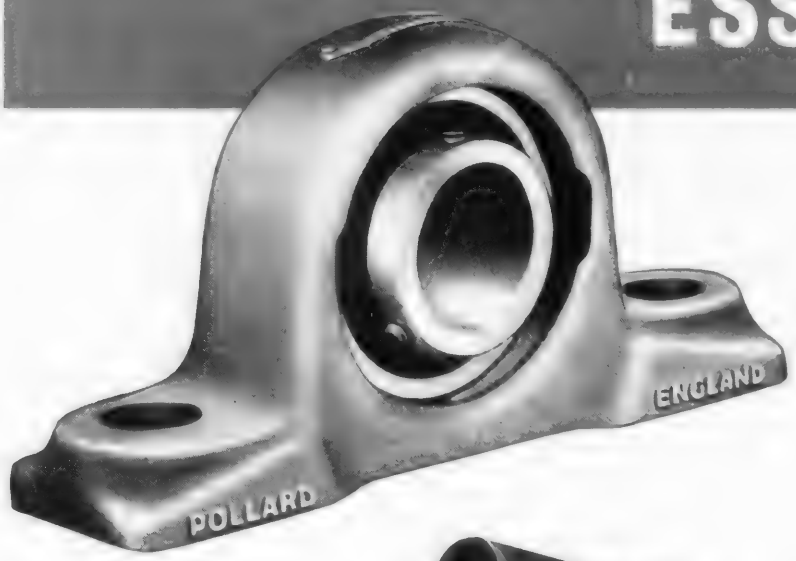

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POLLARD SELF-LUBE PLUMMER BLOCK OR FLANGE UNIT

Ball Bearing

Self-Aligning

Self-Sealed

Self-Lubricated

The POLLARD "SELF-LUBE" sealed bearing design offers the MAXIMUM duty, for the MINIMUM of attention and outlay.

It can be stated that 90% of bearing failures are due to the ingress of foreign matter, and by reason of the great strides which have been made in the manufacture of special lubricants, it has been possible to provide a bearing mounting requiring no servicing whatsoever.

The one piece housing and solid sleeve, enables the bearing to be fitted as a complete unit, thereby eliminating the hazards of an exposed bearing. Further, the improved sealing devices are of the flexible type bonded to a metal insert, ensuring long trouble free service and are not called upon to align themselves to the malalignment of the bearing housing.

This bearing unit gives a life equal to, or greater than, the standard open type bearing of similar size, periodically lubricated, and is available from ½" to 4" shaft diameter.

Flange units incorporating the same advantages as outlined above are also available. The drawing on left, illustrates the flange unit design.

Catalogue SL/2/54 giving further details is available on application to Room G2, Technical Sales Department.

Pollard Bearings also manufacture Ball, Roller and Thrust Bearings (Cat. BRT/1053) Transmission Equipment including Plummer Blocks (Cat. TR.27/2) Clutch Withdrawal and Water Pump Spindle Bearings (Cat. CWFP/54) Max-Load Roller Bearings (Cat. MAX/54) Solid and Flexible Roller Bearings (CAT.RFX) Automobile and Tractor Replacements (CAT. BRM/54)

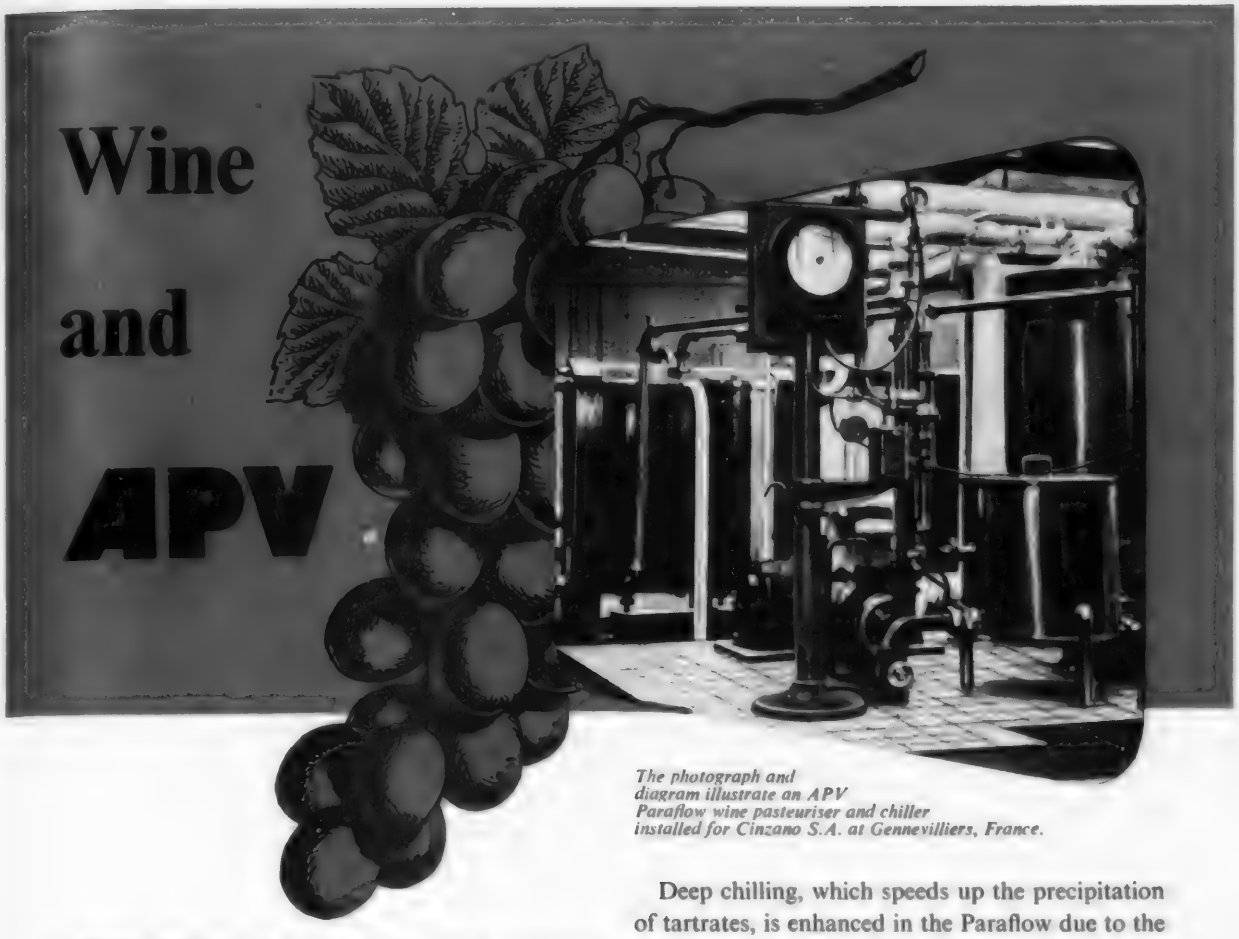
POLLARD BEARINGS LTD., FERRYBRIDGE, Knottingley Yorks. Tel. Knottingley 320 (5 Lines).

London Office : 6, St. James Place, London, S.W.1. Tel. Hyde Park 9248/9.

Canadian Pollard Bearings Ltd. 1103/5 Beaver Hall Hill, Montreal.

PO/1107

Wine and APV



The photograph and diagram illustrate an APV Paraflow wine pasteuriser and chiller installed for Cinzano S.A. at Gennevilliers, France.

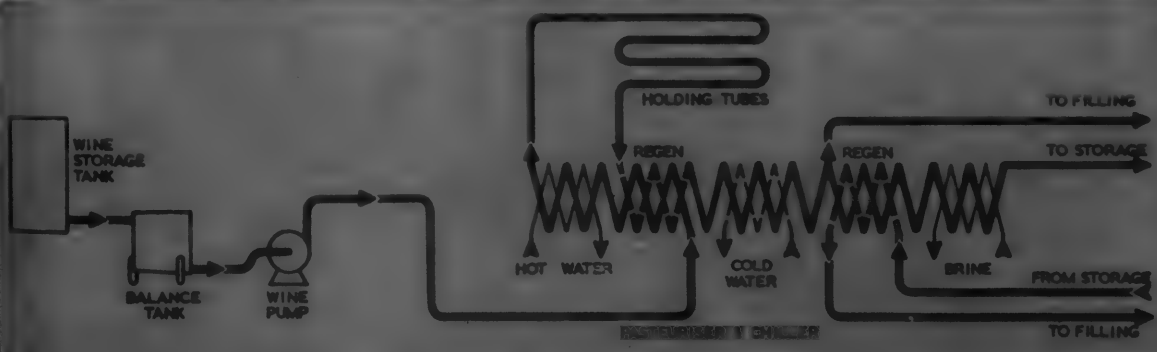
THE APV Paraflow is in wide use in wineries for pasteurisation, deep chilling and fermenter cooling, a single machine in many cases being used for several separate duties.

For pasteurisation and the prevention of unwanted fermentations, the Paraflow is readily adaptable to any combination of temperature and holding time. Risk of re-infection by air-borne yeasts is entirely eliminated due to it being totally enclosed.

Deep chilling, which speeds up the precipitation of tartrates, is enhanced in the Paraflow due to the high rate of heat exchange. This process can be carried out simultaneously with pasteurisation, regeneration being employed for economy in the heating and cooling media.

The temperature of fermentation can be accurately controlled, with a minimum consumption of water.

Due to the stainless steel construction of the Paraflow cleaning and maintenance are facilitated, while the compact design affords considerable economy in space.



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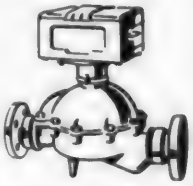
Liquid process control by **MEASUREMENT**

1½" S 7. stainless steel meter with screw on flanges and 12" vertical index.

When you require to measure bulk or batch quantities of edible liquids, oils, spirits and solvents, hot or cold water, we can supply meters with summating, resettable, electrical presettable, direct reading or pointer type index attachments (as illustrated) and control equipment.

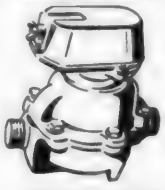


BOX TYPE COUNTER

Re-settable batch-dispensing counter with 7-digit cumulative total register.

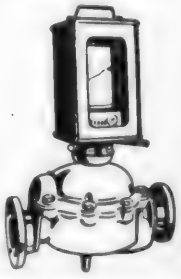
6" VERTICAL RE-SETTING INDEX

Can also be used to pre-set a determined quantity, with electric trip to operate solenoids pumps, warnings, etc.



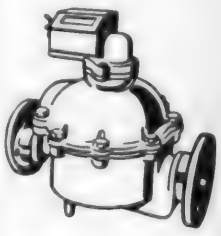
ZEROSET INDEX

Simple turning motion re sets indicator to zero.



MECHANICAL RECORDER

Gives a graphic record on 8" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



PREDEX CONTROLLER

Automatic means for continuous dispensing of fixed quantities of liquids.

MEASUREMENT

INDUSTRIAL **LIQUID** *METERS*

(A COMPANY OF THE PARKINSON & COWAN GROUP)

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a HUGE Stride Forward in Container Filling Technique

Note the dial thermometers (one per pump) and the tachometer to indicate filling rate per minute and record total fillings during run.

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for liquids, semi-liquid and viscous products including jams, jellies, marmalades, soups, syrups, lemon curd, creams, etc.

A FEW OUTSTANDING ADVANTAGES

Infinitely variable filling rates
(according to product and type of container)
30 to 240 1 lb. containers per minute
30 to 240 ½ lb. containers per minute
30 to 120 2 lb. containers per minute
30 to 80 3 lb. containers per minute

Infinitely variable conveyor speed
Automatic continuous container feed and delivery from 30 to 240 per minute on stainless-steel chain conveyor.

Comprehensive safety standards
Pumps and conveyor electrically interlocked (both starting and stopping). Foolproof mechanical interlocking between pumps. Full enclosure of driving mechanism and electrical controls. Smooth contouring for hygiene preservation.

Micro-regulation whilst filling
Smooth and accurate filling, non-spilling, non-aerating, micro-regulated whilst machine is running.

Infinitely variable pump delivery
146 to 544 gallons per hour from each of two pumps—operable separately, simultaneously or consecutively.

Perfect protection of products
Whole fruit strawberries and cherries, for example, will not even be bruised.

Write at once for the complete specification and learn just how much you will gain in speed, efficiency, accuracy, economy and convenience. Specify KELLIE TYPE IIFP (Patents pending).

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The last word in Filling Machines ... by KELLIE ... of course

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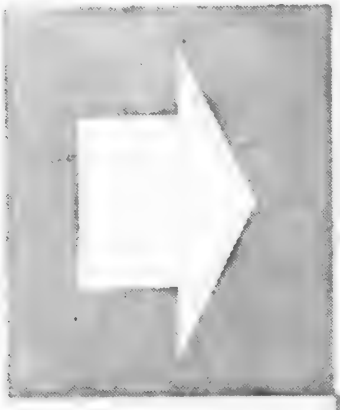
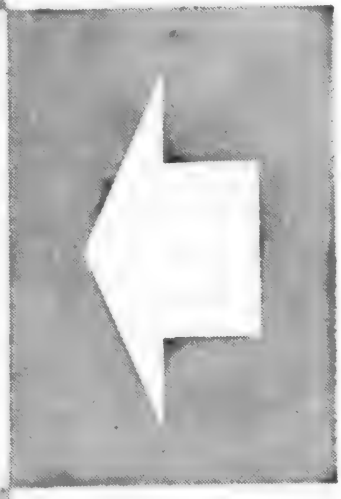
Telephone ... Telegrams & Cable Address ... "Kellie" DUNDEE ... A.B.C. (5th Edn.)

I.C.I. DENDRITIC SALT

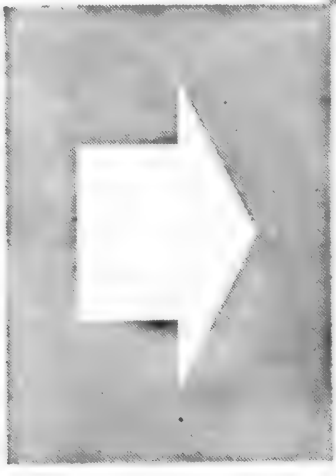
—a NEW fine grade for foodstuffs



I.C.I. Dendritic Salt is a fine vacuum salt with a new crystal shape. It is soft and floury, with the following distinctive qualities—which are of special advantage in many applications in the food and dairy industries :



- Outstanding non-caking properties
- High purity—99.6% sodium chloride
- Blends well with other finely-divided materials
- Low bulk density—ensuring good covering power
- Rapidly soluble in water



I.C.I. Dendritic Salt is of particular interest to users of Dairy or fine Crystal salt, since it not only offers technical advantages but is also cheaper.

Imperial Chemical Industries Ltd. are the sole manufacturers of Dendritic Salt, which is protected by patents in Great Britain and other countries throughout the world.

IMPERIAL CHEMICAL INDUSTRIES LTD.
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TELESCOPES have no place in the science of gastronomy. Yet the observation of heavenly phenomena and the creation of heavenly food have something in common. For food manufacturers too must focus their attention on significant physical facts — the physical properties of the ingredients they use.

Take meat pies, for instance. Good meat needs an equally good covering to do it justice. And for the pie paste, nothing is more important than a first-class fat. The fat should be a pure white colour, it should be perfectly bland and have no taste. In performance, it should stand up to the rigours of practical work without breakdown. This particular combination of qualities is to be found only in a first-class white shortening.

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For specialised products such as Jelly marmalade. In colour and clarity, "X.L.Grade" replaces powdered pectins at less than half the cost.

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LIQUID SLOW-SET PECTIN

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TWENTY-FIVE YEARS ago, William Evans & Co. pioneered the manufacture of Pectin in Great Britain. Their unique experience is freely available to jam makers through the Technical Advisory Service. Sample quantities for production testing will be sent on request.

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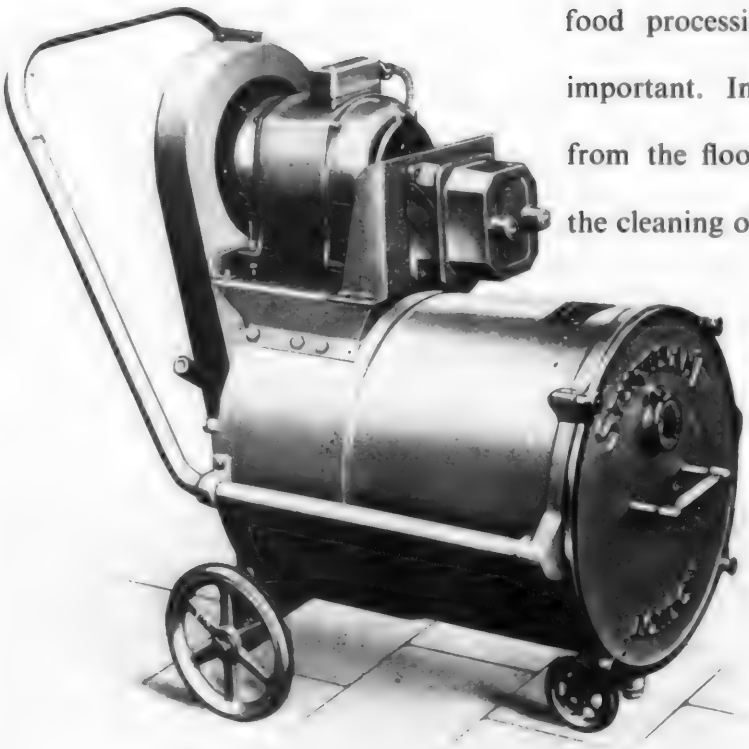
NO 5 OVERDRIVE



This high-powered Portable Vacuum Cleaner meets the need for prolonged and heavy duty cleaning in food processing factories where cleanliness is all important. In addition to removing waste materials from the floors, light-weight attachments facilitate the cleaning of walls, ceilings and internal structures.

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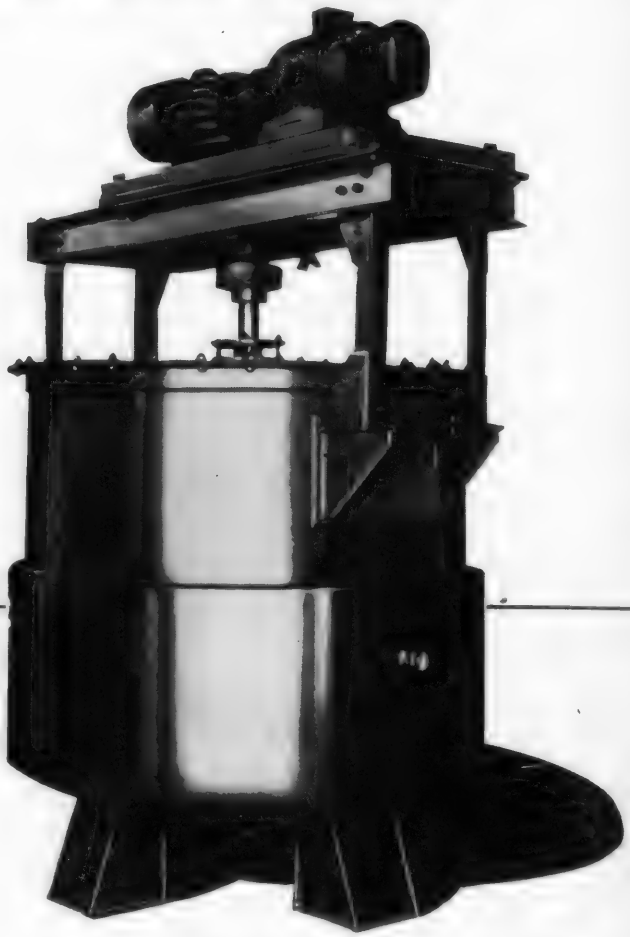

The illustration shows a Steam Jacketed Mixing Pan 4′ 6″ diameter by 5′ 0″ deep, fitted with stirrer gear operated by electric motor and reduction gear. This type of mixing pan can be made in any size to satisfy special requirements and working conditions. Vessels of the same design are supplied with or without steam jacket, or, alternatively, fitted with internal steam coils.

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★ SECURO SEAL FIXED & PILFER-PROOF... READY FOR TRANSIT

UNIQUE DESIGN OF SECURITY BAND BRINGS ADDITIONAL ADVANTAGES

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2 The Security Band can be readily unscrewed and disposed of without cutting.

3 The SecuRO Seal is 100% tamperproof.

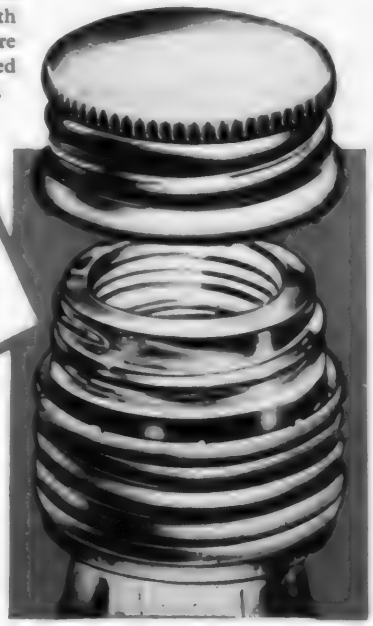
4 The SecuRO Seal has a greatly enhanced appearance.

The SecuRO Seal can be applied by any R.O. Sealing Machine suitably adapted. A small change in the glass finish will be necessary but this can easily be effected.

The tell-tale 'click'. When the SecuRO Seal is unscrewed, cap and Security Band part company with an unmistakable 'click' to assure the customer that he has received the contents intact and undiluted.

★ *SECURO SEAL BROKEN BY THE CONSUMER*

But instead of Band dropping down neck of bottle, it remains on thread and may be removed by unscrewing!



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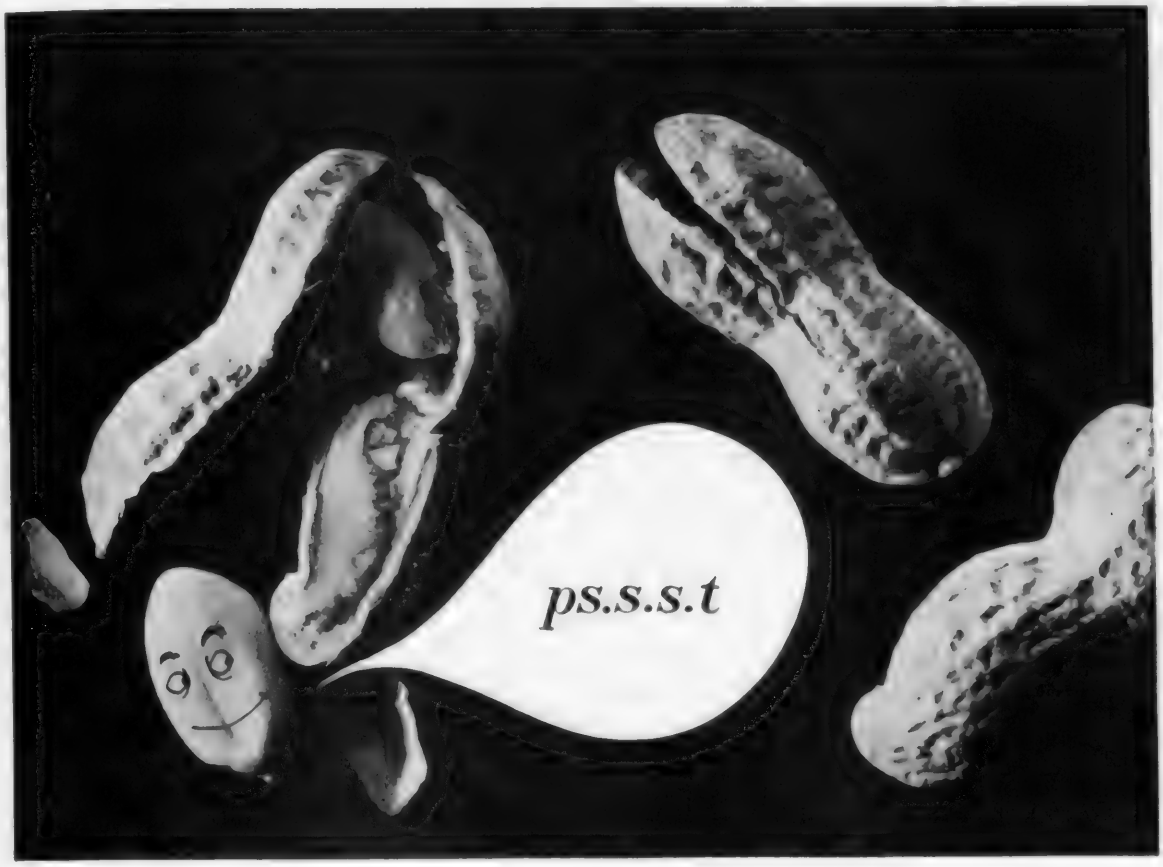

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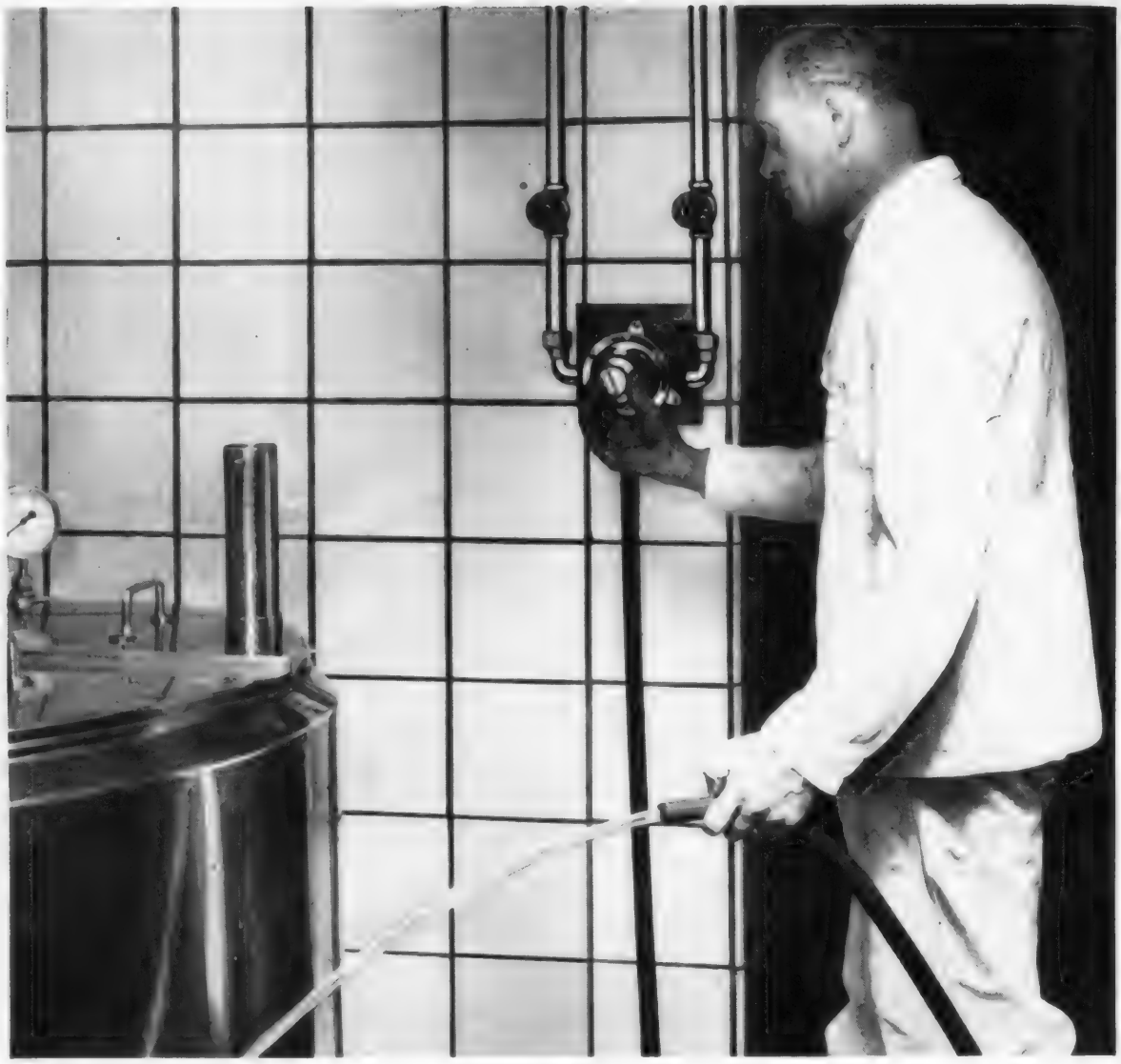

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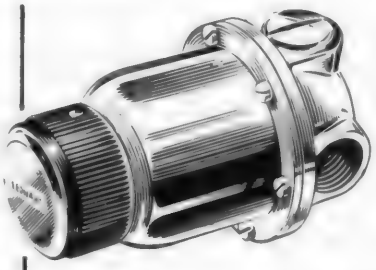
Saves heat, saves water, saves a raft of equipment. More about it, with lists of users, in leaflet No. H 9.



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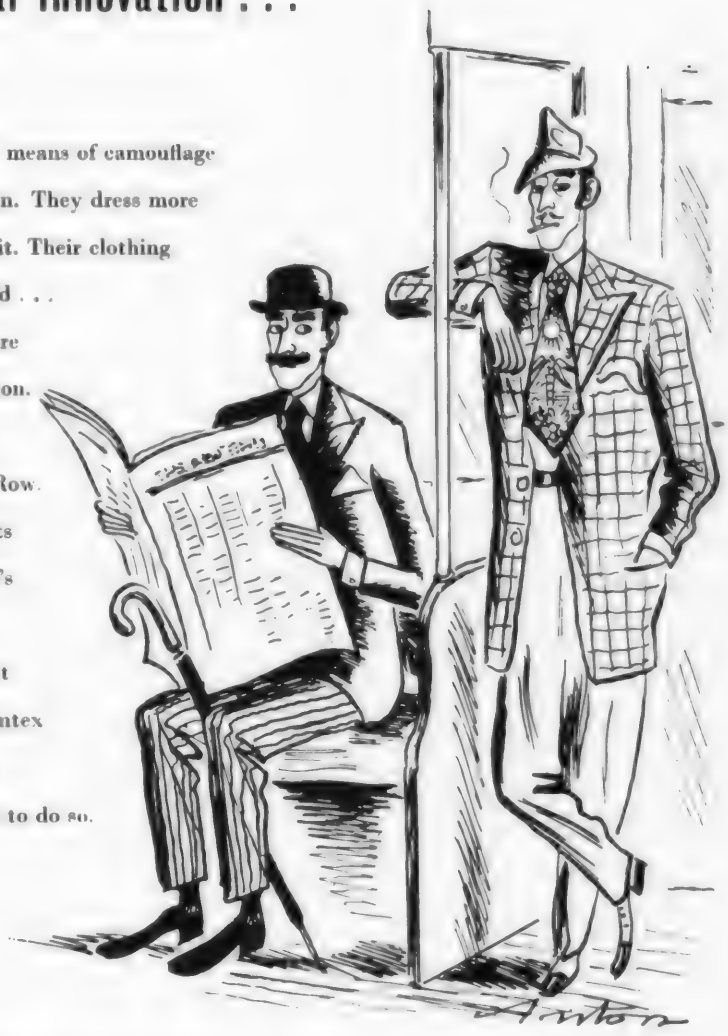

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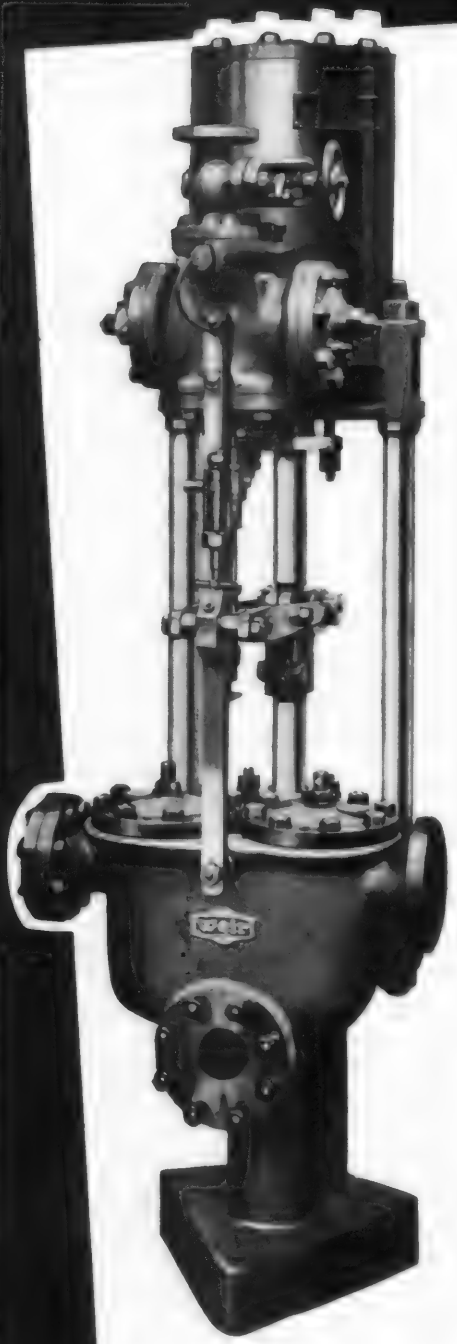

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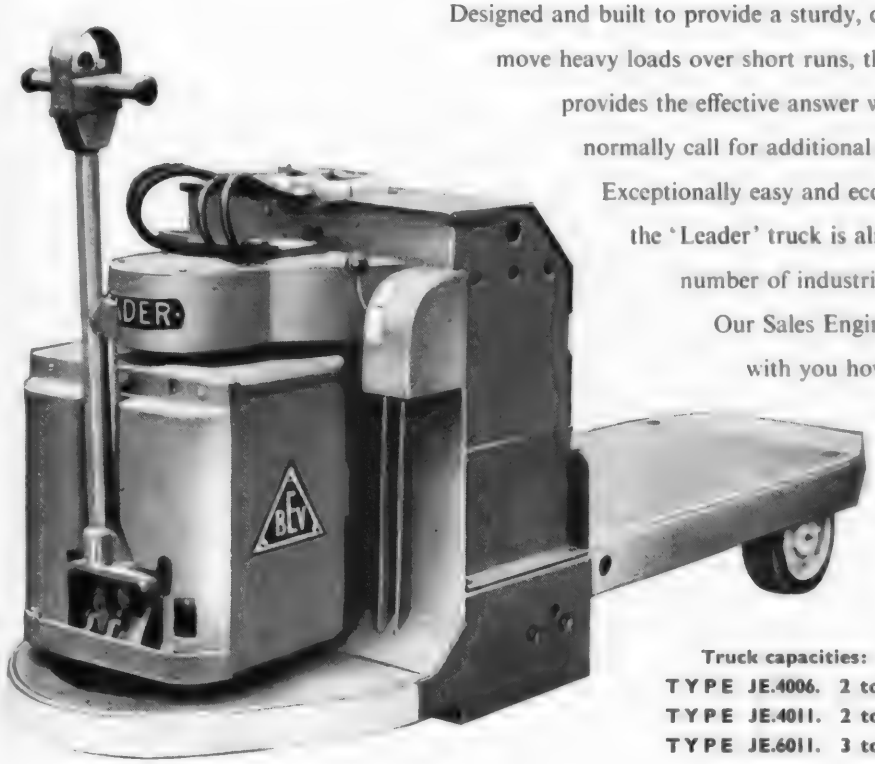

Designed and built to provide a sturdy, compact power unit to lift and move heavy loads over short runs, the JE type 'Leader' truck also provides the effective answer where short ramps and inclines normally call for additional manpower.

Exceptionally easy and economical to run and maintain, the 'Leader' truck is already widely used by a diverse number of industries both at home and overseas.

Our Sales Engineers will be pleased to discuss with you how B.E.V. pedestrian-controlled elevating platform trucks can solve your heavy load, short run problems.

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For full utilisation of storage space.

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To carry stillages of processed parts between departments often in and out of impossible places.

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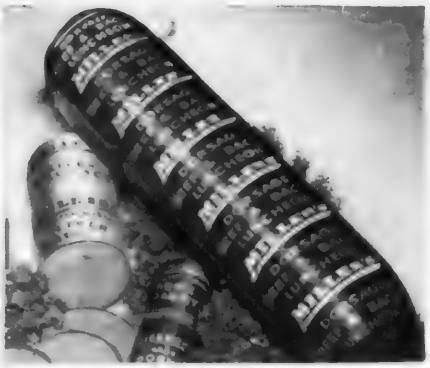

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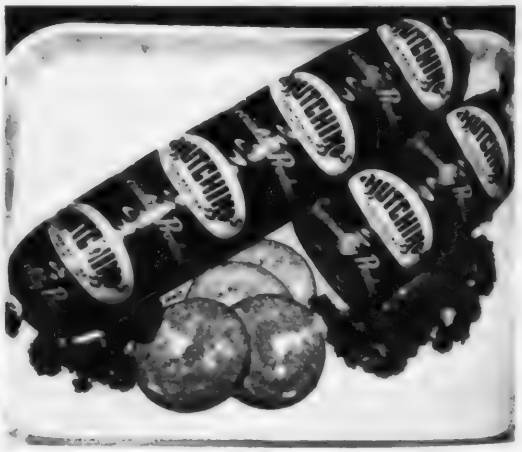

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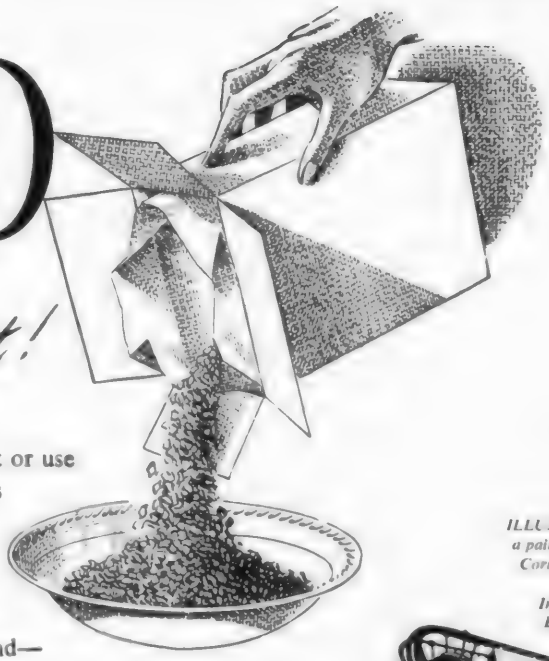

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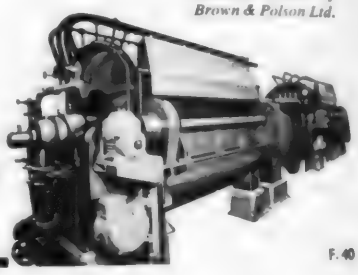

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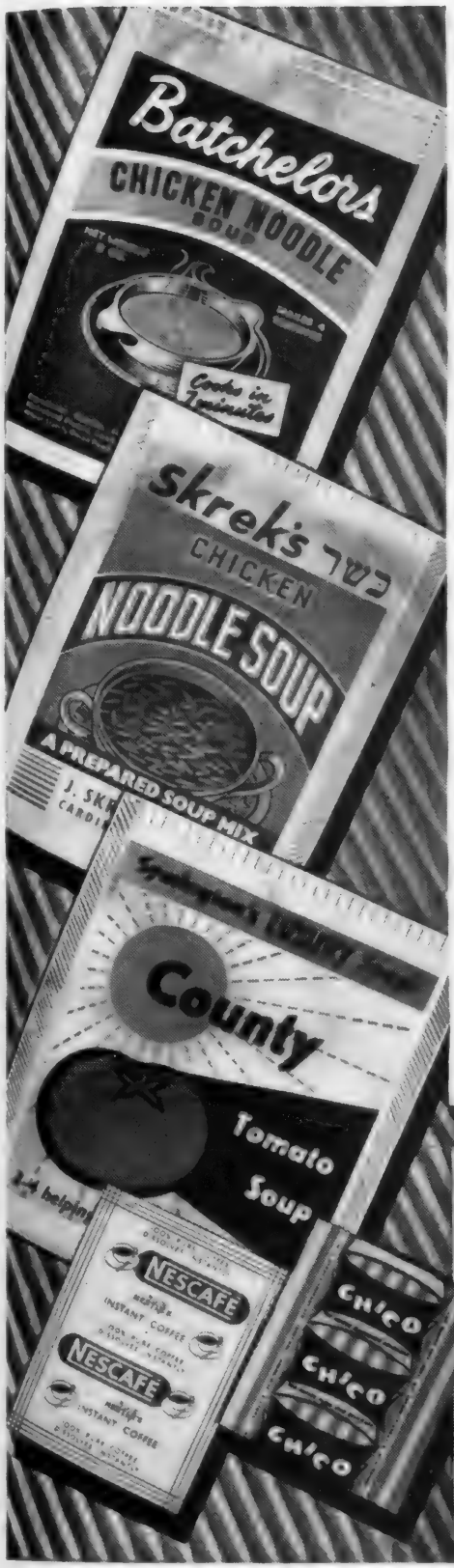

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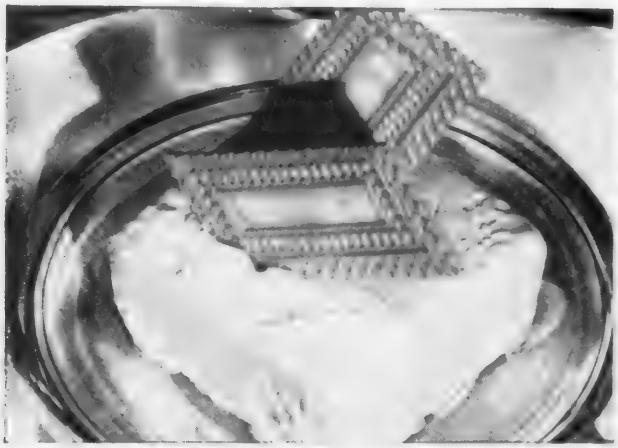

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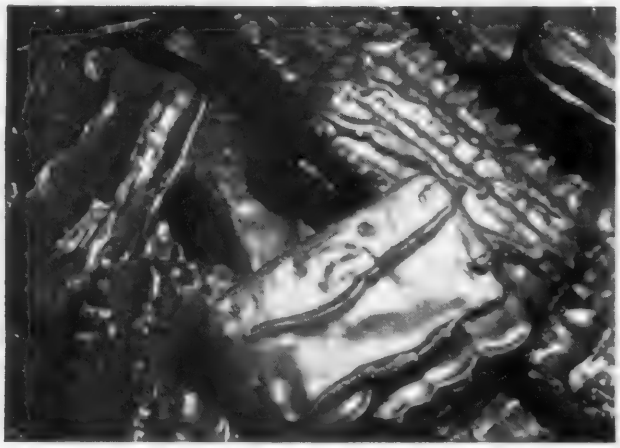

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FOOD MANUFACTURE

Vol. XXX. No. 10 · Published Monthly · October 1, 1955

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FOOD MANUFACTURE

Vol. XXX, No. 10 October 1, 1955

Research on cocoa fermentation

COCOA provided the theme for an unusually interesting and lucid lecture at the British Association meeting in Bristol last month. The speaker was Dr. W. G. C. Forsyth, director of the Colonial Microbiological Research Institute, Trinidad, British West Indies. He pointed out that the fresh seeds of the cacao tree are bright purple in colour, have a bitter and astringent taste, and when dried and roasted give an unpleasant vegetable aroma. In this condition they are completely useless to the chocolate manufacturer and it is obvious that a pretreatment is essential. Dr. Forsyth and his colleagues have investigated this deceptively simple curing process, usually known as cocoa fermentation.

The fresh beans from the pods are covered with a white sugar-rich mucilaginous pulp. To remove the pulp the planter heaps the beans together in such a manner that the pulp is broken down through microbial action. It is fortunate that a method which was most probably primarily evolved simply to remove the mucilaginous pulp should lead to a product of such delectable qualities. The sugars in the pulp are attacked by yeasts which convert them to alcohol which itself is later converted to acetic acid by bacteria in a vinegar type fermentation. These changes have been intensively studied by bacteriologists at the Colonial Microbiological Research Institute. In effect, the beans are killed by the heat and acid produced by this external fermentation about the second day and are allowed to soak in the hot acid liquor for about five more days, during which time striking changes due to enzymes take place inside the beans. They are "stewed in their own juice" and when dried and roasted are of mild taste and rich chocolate aroma. The purple colour has been replaced by chocolate brown and the beans are ready for simple conversion to chocolate.

The fraction of the bean which suffers the greatest alteration during the curing and is the chief contributor to the flavour, aroma and colour, is undoubtedly the so-called "tannin" fraction. This consists of a complex mixture of phenolic substances which have been successfully separated by the modern technique of chromatography in the laboratories at Trinidad. The changes in a single bean during fermentation can be followed by paper chromatography.

One group of these phenols—the leucoanthocyanins—appear to be intimately associated with the chocolate taste and aroma complex and their structure is being investigated.

With the knowledge of the chemistry of the process which has been gained by Dr. Forsyth and his team, it has proved possible to imitate the curing process in the laboratory without the aid of micro-organisms and to produce a reasonable chocolate.

Problems of prosperity

THE hot and brilliant summer has more than compensated ice cream and soft drink makers for the dismal affair of last year. For many firms it has been the best summer in their history, for while the summer of 1949 was equally prodigal of sunshine, manufacturers were unable to make the most of it because many raw materials were still rationed. This year's has been the first good summer since the abolition of rationing and although it brought a record consumption of ice cream (likely to result in a record 100 million gal. for the year) and soft drinks (thought to be double that of last year) it also brought problems. The ice cream industry found its container and vehicle fleets too small to cope with the increased demand, while soft drinks manufacturers suffered from a shortage of skilled staff and suitable bottles. One maker in London had to close down an additional emergency bottling plant because of the bottle shortage. Long hours —factories working from 6 a.m. to midnight and longer, seven days a week—have been the rule.

The canning industry also looks as if it has broken all records this summer. The exceptionally heavy pea crop and large quantities of most soft fruits and vegetables are mainly responsible for what seems to be the best ever food canning season. The summer has been most beneficial to the large-scale expansion schemes which many of the leading canners and can-making companies have scheduled. Tinplate supplies, however, are causing some concern in the industry. This year, according to the *Financial*

Times, tinplate consumers have been saved from serious shortage by imports from the U.S. and France, but by the end of the year stocks will be very low. Extensions planned to the Ebbw Vale tinplate works should raise their capacity to 300,000 tons annually, but this will not be available during the first quarter of next year when the industry is stocking up and it seems likely that more imports will be needed in 1956.

World nutrition problems

THERE is need to develop foods which utilise good sources of protein other than milk for the mixed feeding of infants and for improving the diets of children. This is suggested by the joint FAO/WHO expert committee on nutrition in their fourth report in which, as in previous reports, particular attention is paid to protein malnutrition and its solution through the provision of greater supplies of protein-rich foods for mothers, infants, and children. Careful study of the nutritive value of such foods, of their suitability for children, and of methods of storage, preservation, and distribution is also required.

Another subject treated at some length is the enrichment of dried skimmed milk with vitamins A and D. Milk in this form is coming into increasing use, and has been found valuable as a source of easily assimilated animal protein in supplementary and emergency feeding programmes. However, the skimming process removes vitamin A. Provided technical difficulties can be solved, the addition of vitamins A and D to dried milk for use in nutrition programmes in areas in which deficiency of these vitamins is prevalent could do much to increase the value of this "surplus" food.

Pellagra, a nutritional disease associated with a diet restricted in variety, in which maize predominates, is described and discussed. It is suggested that a summary of the information available on pellagra should be prepared and published in order to call attention to the disease as a public health problem, stimulate further research, and aid in planning control programmes. Countries in which pellagra is a problem because of the high consumption of maize must be encouraged to develop agricultural production of other appropriate foods, to improve diet through educational programmes, and to undertake pilot projects for the control of the disease.

A section of the report is devoted to diseases caused by excessive consumption of certain foods. There is evidence to suggest that degenerative heart disease, which is the most frequent cause of death in North America, in most of Europe, and among the more prosperous segments of the population in many other parts of the world, may be due in part to habitual diet, particularly to high fat diets. Studies of the relationship between diet and the development of degenerative diseases not previously suspected to be nutritional in origin have been made recently in a number of countries, and further research along this line is to be encouraged, since "there is every reason to believe that nutrition must occupy a most important place in a new type of epidemiology . . ."

Another problem considered in the report is the very topical one of food additives. The problem is complicated by the infinite variety of its manifestations from one country to another and by the widely differing regulations which have been adopted concerning food additives. For instance, 22 countries permit certain specified colours to be added to foods; but, out of a total of 82 such colours, only one is permitted in all the 22 countries concerned.

As a first step towards co-ordinated international action, the convening of a WHO/FAO conference of representatives of groups already working on food additives together with representatives of interested member states is envisaged.

Salt-rising bread

THE PAST year marked the 25th anniversary of the founding of the Bread Fellowship of H. A. Kohman at the Mellon Institute, Pittsburgh, U.S.A. This Fellowship has been engaged in a study of the processes employed in making salt-rising bread for this entire period. Its work has resulted in the development of a reliable yeast product suitable for the commercial production of salt-rising bread. An improver for salt-rising bread has also been found which further simplifies production and enhances the quality of the bread.

Before these products were introduced to the baking industry, salt-rising bread was virtually unknown throughout most of the United States. It was seldom produced commercially because the only known method of making it involved the spontaneous fermentation of warm corn meal batters. This method is much too unreliable and slow. Since the advent of a suitable commercial starter, however, bakeries in recent years have produced successfully and profitably an estimated 25 million loaves annually.

For the past few years the Fellowship has been investigating a slight attenuation in the accustomed flavour and aroma of salt-rising bread. This occurrence is believed to be due to some unknown bacteriological change in corn. However, a complete understanding of the variation in the bread has not yet been reached. With a view to present-day consumer demands and bakery techniques, baking tests are currently being carried on to determine the best possible formula and production procedure for achieving the most satisfactory results.

Drinks in tins

IF the President of the Royal Academy was right when he said that a nation's character may be judged by its drinking vessels (see our Obiter Dicta column last month), the recent exhibition "Drinks in Tins" may mark a new epoch for future students of the British and American way of life. The exhibition showed cans used in the U.S.A. and Great Britain for packaging beer, soft drinks, chocolate beverages, wine, fresh milk and fresh water.

Beer and soft drinks have been canned for several years and are particularly popular in the U.S.A. where, according to a report published by the *American Metal Market*, the beer can has reduced the number of American breweries from hundreds to scores by cutting the number of franchised bottlers. Canned beer is said to be more economical, more convenient for the consumer and to stay lively longer. In the U.S. canned beer sales have shown a 740% increase during the past 15 years. British beer drinkers are far more conservative, but even so there has been a decline in the consumption of draught beer in favour of bottled, just as there was in the U.S.A. This suggests that there may be a future for the beer can in Britain. The Metal Box Co. think so and are to introduce flat top beer cans to the home market soon.

Canned wine, as might be expected, has provoked a lively correspondence in some newspapers between traditionalists and iconoclasts. After all, the latter point out, France supplies canned wines to her colonial troops and who should know more about wine than the French? Californian and Australian sherry and other wines have been successfully packed in cans but this is not likely to impress the traditionalists. Certainly a dusty, cobwebbed tin of port, however reverently handled by the head waiter, is unlikely to inspire the same respect as a bottle in the same condition. Much of the prejudice against cans is undoubtedly due to the wine snobbery which afflicts many Britons after a holiday or two in France. But as long as it remains there will be poor prospects for wine in cans.

Milk for the millions

IN many countries millions of people have never tasted milk in their lives, according to the F.A.O. An example is India, where milk is still too expensive except in the "natural pockets" where it is produced.

Milk production has always been of particular interest to F.A.O., whose fundamental aim is to raise the nutritional levels of the world's population. Two major items on the agenda of the June 1955 Session of the F.A.O. Council were concerned with milk: the first was the consideration from an economic point of view of the problem of disposing of milk surpluses and the second was the Director-General's suggestion that a major new activity for 1956 should be an expansion of the work being done, mostly in co-operation with the U.N. Children's Fund, to increase milk consumption.

F.A.O. find that the first thing is to increase consumption by making cheap milk available and then slowly to improve quality without raising the price. Gradual natural development will keep the price down.

Obviously there is no short cut in such a system as this and until a country's dairy herds have been built up sufficiently the gap must be filled with imported milk products. One way in which this is done is to mix dried skim milk, obtainable in large quantities from the main producer countries, with locally produced buffalo milk which has around 7% butterfat to produce "toned" milk of 3-3½% butterfat—a cheaper product and more suitable for children. A much larger volume of milk is handled in this way, helping to keep the price down.

F.A.O. say that considering the enormous need for more milk in the greater part of the world, there is no reason to fear that local production in the less developed regions will increase so rapidly as to reduce demand for the imported product.

Indeed, at present the reverse is the case. In India the annual value of imported dairy products in recent years has been around £5 million p.a., but a government spokesman pointed out recently that this was only 2% of the value of the locally produced milk.

Foods for oldsters

IN VIEW of the gratifying success of canned baby food sales it is only logical that the possible market at the other end of life should be explored. Special foods for old people, technically known as geriatric foods and euphemistically called "Senior Foods" have been announced by the H. J. Heinz Co. in America.

The first of the new products will be beef stew, lamb stew and chicken stew. They will be high in protein, calcium and iron content and low in calories. They are to be processed without added salt for the benefit of sufferers from hypertension. To make them especially suitable for those who live alone they will be packed in 8½-oz. individual portion tins.

The sales of strained baby foods are among the highest of all canned foods sold in the U.S. and though this is far from being the case in this country, over £2 million worth are sold here every year according to the *Financial Times*. Heinz are the principal manufacturers.

Of course an exact parallel can hardly be drawn

between geriatric foods and baby foods. Although we all start as babies not everybody grows old. We cannot help thinking that the foods will bring their own consumer resistance problem. We are as young as we feel and many people have to grow very old indeed before they will admit to needing special foods.

However, Heinz are hopeful. The world's population of persons over 60 years old is growing steadily and Heinz have found that there are about 18·5 million over-60's in the U.S. as compared to only 8 million in 1920. By 1960 an increase to 23·5 million is anticipated.

The company are holding marketing tests in Cincinnati and St. Petersburg and it will be interesting to see how these turn out.

Farmyard fads

RECENTLY we reported that dogs like strongly flavoured, garlic-like foods and that at least one elephant was fond of wine. However, the findings of an American manufacturer of flavours on the variety of tastes and preferences shown by other animals make these predilections seem comparatively unremarkable.

Strawberry is said to be one of the most popular flavours for poultry feed and baby pigs like Parmesan cheese more than anything else. Some chickens, we are told, have a cannibalistic relish for a dark, grey-black, flaky substance made from their own sisters' feathers!

The discovery that antibiotics can be used as a growth stimulant in animal foods seems to have started the research which aims at getting animals fatter quicker.

One result is the discovery that contented beasts grow faster and yield better meat, milk, or eggs. Hence in addition to such widely publicised experiments as providing background music for cows and air-conditioning for pigs, great pains are being taken to study the creatures' individual tastes.

Animal flavour and colour preferences do not always seem consistent. Livestock and poultry like green foods with sweet flavours, while rabbits and sheep prefer orange colours and nutty flavours.

Most of today's feed supplements have a bitter taste and obnoxious odour, so that the flavour must mask them as well as impart the desired flavour. One reason for the bitterness and smell of the supplements is that they are increasingly being made from new sources.

Seaweed, cotton gin waste and corncobs are being examined as possible animal foods. Even trees are being subjected to atomic radiation to transform the wood into a digestible livestock feed.

"Frig" pioneer

WHILE Pictet's work and Carré's discovery in 1860 of compressed ammonia as a cheap and efficient refrigerant are well enough known, we should also pay tribute to forgotten James Harrison who preceded Carré just a century ago. Harrison was a Scot who emigrated to Australia, became editor of the *Melbourne Age*, and was versatile enough to take time off from his journalism to struggle with the problem of commercial refrigeration.

To appreciate the urge to find some way of packing meat and other foods for transport before refrigeration and modern canning became established, we need only refer to a few of the 200 patents and processes of the last century. Apart from Dr. Bancroft's pemmican, and Alexander's powdered beef, there were proposals like that of De La Peyrouse for packing meat in barrels and pouring in thick layers of molten fat. Medlock and Bailey claimed to preserve anything "from a beefsteak to a bullock, from a whitebait to a whale," all kept "sweet" for months by dipping the flesh in "bisulphide of lime." And so the ideas and failures went on, with Redwood trying paraffin for molten fat and the curious Professor Gamgee describing cattle being "happily dispatched" by forcing them to inhale carbonic acid gas at a cost of two to three shillings per head. Although Gamgee claimed that the flesh was subsequently "bright and fresh," a Society of Arts committee pronounced some chops from sheep killed in this way as "slightly flat," to say the least.

In a century when an enterprising American importer would ship a cargo of ice to the Cape so that he could bring back his grapes in prime condition, Harrison was hard at work with his refrigeration ideas. His efficient ice-making machine of the eighteen-fifties worked on the Perkins principle of evaporating ether to obtain the required low temperatures. His 1856 English patent was the result, staking his claim in this field prior to the coming of ammonia at the hands of Carré, an improvement which resulted in the first Australian ice-plant turning out 8,000 lb. per day.

James Harrison bridged the gap between the pure physicists and the practical men. He corresponded with Faraday and Tyndall on the one hand; and on coming to London in 1857 he was ready to collaborate with the Siebe brothers of Holborn. Yet full success in Australian meat-packing eluded him, despite his large effort in freezing several carcases of sheep and sides of beef which were all consumed six months later at a banquet, "without any ill effects." As with many early pioneers, Harrison failed financially in his shipping of frozen meat, a venture he found far more harassing than his editorship at Melbourne.

TOUGH, STRINGY, CRISP, MEALY, SOAPY . . .

Texture in Fruit and Vegetables

By F. A. Isherwood, B.Sc., Ph.D., M.A.

(*Low Temperature Station for Research in Biochemistry and Biophysics, University of Cambridge and Department of Scientific and Industrial Research.*)

Texture is very important in determining the quality of most vegetables and fruits. The author discusses the chemical factors underlying texture in relation to the various changes which occur during ripening, cooking, wilting and drying of vegetables. Particular emphasis is laid on the role of lignin and some observations are mentioned which may lead to a new sensitive method for the determination of lignin in plant tissues.

TEXTURE is intimately associated with the structural make-up of the fruit or vegetable whether raw or processed, and variations in texture have a great deal to do with the acceptability. For example, there is a general preference for "mealy" main crop potatoes, "soapy" early potatoes and "crisp" celery. Texture includes such qualities as toughness, stringiness, slicing quality and crispness. A suitable texture in a fruit or vegetable is determined in the first instance by the subjective judgment of the consumer and clearly there is no standard which will cover all materials. The scientific methods being applied in the food industry are mainly designed to avoid fluctuations in the texture of the finished product and are applied not only to actual manipulations in manufacturing processes but also to the examination of the finished products in determining how well they meet consumers' tastes. For example, canners may determine the tenderness of peas when they are packed, by the use of a machine which measures the weight required to press a cotyledon to a definite fraction of its size. Such methods, however, are mostly empirical and do not give any information about the actual factors which give the characteristic texture to a fruit or vegetable. Through lack of this fundamental knowledge, any departure from the standards which the canner has decided upon will mean a largely empirical check on the manufacturing process, which may in extreme cases go all the way back to the maturity of the raw materials—the labour involved may be considerable.

Factors affecting texture

These may be very loosely divided into two classes depending upon whether they appear to be obviously connected with the cell wall or not. However, experience indicates that all the factors tend to be inter-related and changes in texture are not caused by any one factor alone. This would be expected when one considers that the various constituents of the plant are in dynamic equilibrium with each other and that the soluble sugars, acids, phosphoric esters, phenolic substances, amino acids, amides and other metabolites are being continuously produced from and built into the insoluble materials of the plant cell wall. Changes in texture must in the final instance be related to changes in the overall pattern of the cell composition and structure, and though the obvious approach may be to examine the cell wall structure, a detailed analysis of the soluble metabolites may give more significant information.

NON-CELL WALL CONSTITUENTS

Only a few non-cell wall constituents have been studied in any detail and of the soluble constituents probably none by modern chromatographic methods. It is therefore difficult to comment on the relation of many of these constituents to texture, but where investigations have been made the importance of these constituents is plain.

Starch

In the case of the potato, which has been more thoroughly studied than any other vegetable, the causes of "mealiness" and "non-mealiness" have been shown to be linked not only to a weakening of the adhesive properties of the middle lamella which cements the cell walls of the individual cells together, but to the swelling of the gelled starch within the cells in helping to pull the cell walls apart.[1] In cooked samples of waxy texture, the swelling of the starch does not progress sufficiently to cause cell separation, whereas in "mealy" cooked tissues the cells readily separate. If, however, the swelling of the starch breaks the cell wall, the escape of the gelled starch from the ruptured cells in the cooked tissue causes an unpleasant sticky or gummy texture. An examination of the starches from "mealy" and "non-mealy" potatoes has revealed that the relationship of texture to the starch in the cell may be even more fundamental than the observations described above would indicate; the soluble starch from non-mealy potatoes consistently showed more intense staining (amyloid blue with iodine) than did starch from "mealy" potatoes and this may be linked with differences in the hydration properties of the gelled starches.

Enzymes

An example of the influence of cell constituents of a different type has been described for canned tomatoes.[2] The firmness of the

fruit from those strains which produce the firmest fruit appears to be conditioned not only by the presence of larger amounts of calcium but by the greater activity of the enzyme pectin-methylesterase. This enzyme forms a larger amount of low methoxyl pectin which in the presence of the calcium gives more of the tissue-firming calcium pectate.

Phytin

Calcium pectate is also concerned in the texture of cooked peas but in a different way from tomatoes. While a certain degree of tissue-firmness is desirable in canned tomatoes, the opposite is true of peas, which, when cooked, must be soft. In particular, they must not show the phenomenon of an unpalatable hardness which is not changed even by prolonged boiling ("uncookable"). The softening of normal peas during cooking[3] is due to a reaction between unaltered phytin (inositol hexaphosphate) in the cell and the calcium pectate of the middle lamella. The latter loses calcium to the phytin which forms the very insoluble calcium phytate. The removal of the calcium causes the dissolution of the middle lamella, the adhesion between the cells weakens and the pea softens.

If, however, the phytin is destroyed, the peas will not soften and they become "uncookable." This happens if peas are stored, prior to cooking, in such a way that the enzyme phytase (which occurs normally in peas) is allowed to break down the phytin, for the products of the breakdown, inositol and phosphoric acid, do not give highly insoluble calcium salts.

CELL WALL CONSTITUENTS
and the texture of relatively simple tissue

Most investigations of texture have centred on the cell wall itself. Inasmuch as it is the cell wall which serves to give rigidity to the plant, this is the obvious subject to study. In the edible portions of vegetables and fruits, the cell membrane materials found most abundantly are cellulose, the hemi-celluloses such as xylan, mannan, galactan, and araban, and the pectic substances. These are all built up from simple hexoses and pentoses by glycoside union between one sugar and the next so as to form in many cases long thread-like polymers. Pectic acid differs somewhat in that, though it is a linear polymer of galacturonic acid residues, the carboxyl groups are free and in the presence of a divalent metal ion such as calcium form a bridge between the thread-like polymers. The whole then resembles a three-dimensional network, which locks together a mass of other thread-like polymers to give a rigid structure. If the calcium is removed from the calcium pectate the whole structure rapidly breaks down. Pectin is pectic acid partially esterified with methyl alcohol. It is affected by the presence of calcium ions in somewhat the same manner as the free acid.

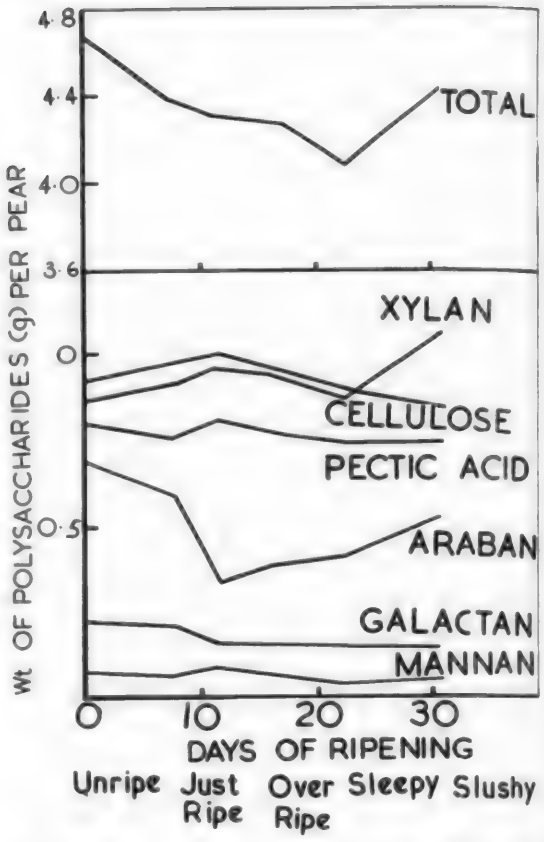


Fig. 1. PEARS. Changes in the polysaccharide constituents of conference pears during ripening at 15°C. The material included polysaccharides which were insoluble in 80% ethanol such as pectin. The points to note are that the amounts of the individual polysaccharides vary independently as ripening proceeds and that the total amount of all polysaccharides rises at the very end of ripening when on general grounds the reverse might be expected.

Pectic substances

The early quantitative chemical studies of the cell wall of apple, tomato and potato showed conclusively that softening occurs during ripening, storage and cooking as the result of changes in these so-called pectin substances (pectin and calcium pectate). In every instance[4] soluble pectin was formed progressively at the expense of insoluble pectin ("protopectin") and, when these quantitative studies were accompanied by microscopic examinations, it was found that the cell walls became progressively thinner and the inter-cellular substance disappeared until finally the cells were found to be entirely separated from each other. In the case of ripening these changes were dependent upon the activity of enzymes present in the fruit or vegetable.

A somewhat similar change has been shown to occur when certain pectolytic (pectin splitting) organisms invade the plant tissue. For example, *Bacterium carotovorum* which is responsible for a soft rot in carrots, preferentially dissolves away the insoluble pectin of the middle lamella and finally causes the cells to separate. The in-

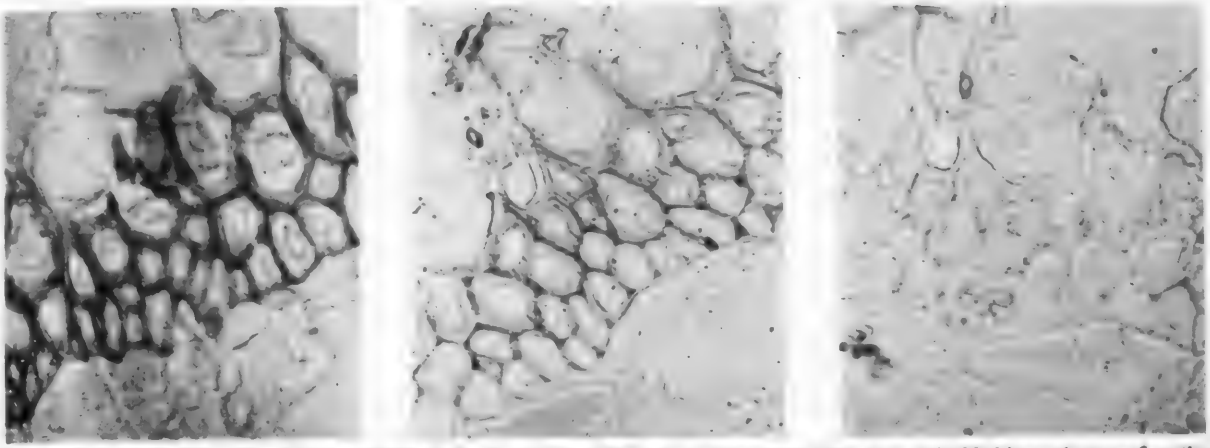


Fig. 2. RUNNER BEANS. Cross sections of the "parchment" layer of the runner bean pod, embedded in a mixture of methyl and butyl methacrylate, before and after treatment with chlorite which removes lignin but does not react with carbohydrate material. The sections were 2$_0$ $m\mu$ thick and were photographed using an ultra-violet microscope (wavelength of the light used 2536 Angströms, magnification about × 1,000). Dark areas are due to lignin.

soluble pectin is not converted into soluble pectin but is degraded to small molecular weight oligosaccharides. Otherwise the effect on the tissue markedly resembles that produced by cooking or maturation.

Other polysaccharides

The analytical methods used in the early studies on the effect of ripening and maturation were not able to distinguish between related polysaccharides in the cell wall and no attempt was made to obtain a comprehensive picture of all the changes occurring. The comparative crudity of the methods meant that no hint was given of any interplay between the individual polysaccharides and the cell sap such as is revealed in a more recent study[5] of the ripening of the pear by modern chromatographic methods. This has shown that the various polysaccharides, cellulose, xylan, araban, galactan and mannan, and pectic acid, are continuously being built up and broken down by interaction with the living cell substance, and their metabolism seems to be quite independent of each other. The cell wall is in dynamic equilibrium with the soluble cell contents. A semi-diagrammatic illustration of the results is shown in Fig. 1.

CELL WALL CONSTITUENTS and the texture of complex tissues

The same group of polysaccharides are probably concerned in any changes of texture which occur during ripening, maturation and cooking of many other plant tissues than those described above, but in practice the complex morphological character of most tissues obscures the interpretation of the results. The difficulties inherent in the examination of such tissues are illustrated by a study[6] of the nature of the factors affecting the "stringiness" of kale (stringiness was defined as a tendency of certain tissues in the midrib and veins to hang together). It was found that the sensation of stringiness in cooked kale occurred if the veins were unusually strong; if the mesophyll tissue between the larger veins was particularly tender or even soft, thus making the network of veins appear unpleasantly prominent or "stringy," although the veins themselves might not be particularly strong; and if the network of larger veins was closely woven so that the area of leaf tissue contained a large amount of coarse fibre. From this study it was clear that in assessing by organoleptic methods the texture of such a vegetable, it may be very difficult to decide between the various possibilities and a chemical analysis of the whole tissue would be subject to the same limitations. Perhaps the most important fact that emerges from a close consideration of this type of tissue is the part that a non-polysaccharide constituent called lignin plays in toughening the various fibrous elements such as the veins and supporting mechanical tissue, and especially in preventing them softening and disintegrating during cooking. In fact, the influence of lignin is so important that it deserves separate consideration from the polysaccharide constituents.

Lignin

Lignin is an aromatic substance found to a considerable extent in some portions of the cell wall. This constituent has been largely neglected in the past because most workers have assumed that, since lignin is only attacked by strong chemicals and is unlikely to be affected by the mild conditions encountered in a cooking period, it has little effect on the textural quality of vegetables. This point of view ignores the fact that lignin may considerably affect the properties of the other compounds in the cell wall even when it is present in small amounts; lignin is a very reactive material and will polymerise and combine with a variety of compounds so that it may render completely insoluble a cell wall consisting of carbohydrate thread-like polymers which would otherwise dissolve away. In fact it may be aptly compared to bakelite in its properties, the cellulose fibres of the cell wall forming the tensile members of the structure. The presence of lignin is therefore likely to com-

plicate the interpretation of any changes occurring in the cell wall polysaccharides, and it is perhaps significant that most of the early investigations, on the effect of ripening and cooking on the structure of the cell wall of fruit and vegetables, were made on tissues which contained very little lignin; it was found empirically that with these tissues a more clear-cut interpretation of the changes in the polysaccharide constituents of the cell wall was possible.

The amounts of lignin present in the woody tissue may be quite high (10-30% of the dry weight) and such amounts are easily detected by simple staining methods (Wiesner reaction, phloroglucinol in alcoholic hydrochloric acid). What has not been recognised until now is that a very small amount of lignin (less than 2% of the dry weight), well below the level at which staining methods will detect it, will profoundly influence the swelling and solubility of the polysaccharides of the cell wall. This was first noticed in studies on the solubility of pear cell wall polysaccharides. Delignification with sodium chlorite did not affect the insolubility of the polysaccharides until the amount of lignin fell below the level of 2%. The cell wall retained its characteristic appearance under the microscope until this lignin was removed, when it completely disintegrated. An example of the binding properties of lignin is shown in Fig. 2. These are ultra-violet photomicrographs of thin sections of the parchment layer of runner bean pods treated with sodium chlorite; the dark areas are due to lignin. When the lignin is completely removed, the cells separate so that an effective photograph cannot be taken unless the whole section is embedded in an inert material before delignification.

Estimation. Before the effect of small amounts of lignin in the cell walls on the properties of the tissue could be studied, it was necessary to devise a sensitive specific method for its determination. The large amounts of lignin present in wood tissues can be estimated by a number of methods, but all these fail when the amount is very small, as the polysaccharides present interfere and mask the effect due to the lignin, and quite small amounts may be vitally important as just noted above.

Attempts to devise new methods such as that based on the copper catalysed oxidation of lignin to vanillin and related aldehydes (estimated spectrophotometrically), showed that though they were more sensitive and specific, they did not yield consistent results. A detailed study of the chemistry of lignin[7] from different tissues indicated that one reason for the inconsistency was that the chemical nature of the important reactive groups in the lignin structure varied with the source. All the available evidence suggested that the nature of the lignin could vary with the age, cultural conditions and variety of the plant and that this was likely to interfere with any of the suggested chemical methods. Further, none of these chemical methods indicated the position of the lignin in the cell wall.

Though the detailed structure of lignins from different sources varies, the one common factor is that all are built up from substituted phenyl propane units and that these possess a very strong absorption in the ultra-violet. Since polysaccharides do not absorb, this fact suggested that an examination of the tissue in ultra-violet light might provide a sensitive reliable method for the estimation of the lignin. Based on this idea, a method has been devised in which photomicrographs of thin sections of the tissue (embedded in a mixture of methyl and butyl methacrylate polymers), 0·5-2·0 mμ thick, were taken using an ultra-violet (wavelength 2536 Å) microscope. From the image on the photographic plate, the amount and position of the lignin can be estimated. The photographs shown in Fig. 2 were taken in this way. With such a method it should be possible to investigate the many problems which appear to hinge on the presence of small amounts of lignin in the cell wall.

Effect of lignin on texture

Runner beans provide a clear-cut example of how lignin dramatically changes the texture of a vegetable. Young beans will snap easily when bent, whereas old beans commonly break to show a characteristic stringy ("parchment") layer consisting mainly of cellulose fibres laid at an angle to the main axis of the pod. The same layer is present in the young bean but the adhesion between the fibres is very much weaker. If the beans are cooked, this parchment layer in the young specimens can be easily disintegrated by rubbing between the teeth, but in the old beans the fibres will not separate and the parchment layer gives an unpleasant spiky texture to the cooked bean. Examination under the microscope shows that the fibres in the old bean pods have become heavily lignified and cannot be separated by such mild treatments as cooking in boiling water. The runner bean has a considerable economic importance as a quick-frozen vegetable because it is preferred for colour and taste to the so-called stringless bean. The extent to which the lignification occurs varies considerably with the season and there is a suspicion that any drying of the bean pod, either in the field or subsequently after picking, tends to increase lignification.

Examination of the pea testa has shown that small amounts of lignin are also present there. It may well be responsible for some of the textural differences which cannot be explained on the basis of changes in the pectic substances.

Perhaps the most far-reaching idea is that the presence of lignin is responsible for the poor quality of many raw dried vegetables, which cannot be reconstituted satisfactorily. A short heat treatment (blanch) which kills the enzymes in the fresh vegetable before drying prevents the development of this condition. The suggestion made is that during the drying of the raw vegetable, the conditions

(*Turn to page 420*)

Better Food for India's Millions

Five Years' Research at the Central Food Technological Research Institute

By V. Balu

This month the Central Food Technological Research Institute of India is five years old. In this short time its staff has made several notable contributions to food technology, including the development of a milk from groundnuts which was described in full in our July, 1954, issue. In this article the author reviews the highlights of the Institute's short history.

AMIDST the undulating plains of Mysore in Southern India stands the imposing Cheluvamba Mansion around which sprawls an extensive estate of more than 150 acres. Once the abode of Princess Cheluvajammanni of the royal family of Mysore, the mansion now houses the Central Food Technological Research Institute (Ceftri) which was formally inaugurated on October 21, 1950, with Dr. V. Subrahmanyan as its director.

The scientific work of the Institute—performed in the hundred-odd rooms of the Cheluvamba Mansion—falls into eight major divisions:

Biochemistry and Nutrition,
Storage and Preservation,
Food Processing,
Quality Control,
Microbiology and Sanitation,
Fruit Technology,
Food Engineering, and
Information and Statistics.

The main objective of the Institute is to help in the utilisation of modern scientific methods for the preservation and processing of different familiar and unfamiliar food materials. A further and closely-related object is to render technical aid to Indian food industries.

Since its inception, the Institute has made rapid progress in food research and has developed alternative foods and supplements of various kinds. It has prepared "synthetic rice" from a mixture of 85 parts of tapioca flour and 15 parts of groundnut cake flour. It is slightly more nutritious and cheaper than ordinary rice. It is eaten in the same way as rice but is cooked in a much shorter time. Arrangements are under way to obtain a medium size plant for producing fairly large quantities of synthetic rice. However, even when produced in large quantities, synthetic rice is meant only as a supplement and not as a substitute for rice.

The Cheluvamba Mansion, once the home of Princess Cheluvajammanni of the royal house of Mysore. This imposing building, together with the surrounding 150 acre estate houses the plant, equipment and laboratories of India's food research institute.

Vegetable milk

To meet the acute shortage of milk and milk products in the country, Ceftri has produced a nutritious vegetable milk from groundnut. (*See* FOOD MANUFACTURE, 1954, **29**, (7) 271-275). When stabilised, deodorised and fortified, the milk resembles cow or buffalo milk. One pound of groundnut yields about 8 lb. of milk. Its price is about one-third of the animal milk and it is equally nutritious. Good curds and buttermilk have been made from the groundnut milk.

The Institute has been preparing and supplying, for the past four years, vegetable curd to hotels and catering establishments in Mysore. A plant of 500 lb. capacity per day has been set up in Trichur for large-scale production of the product. A dehydrated vegetable curd, which on reconstitution yields the original product, has also been prepared. It may be of interest to know that based on this work, Indonesia is now setting up a plant for the production of vegetable milk on a large scale.

Storage studies

With the national economy of the country demanding that home food supplies should be conserved to the utmost advantage, a good deal of attention has been paid to the evolution of scientific methods of storage.

Insect damage to food grains has been prevented by storing grains in jute bags impregnated with an insecticide and injecting ethylene dibromide into the grain. The method is not costly and large-scale trials have given satisfactory results. The stored grains are not affected in any way by the chemicals used.

The storage life of tapioca tubers has been extended from 3 to 25 days by a cheap process of treatment with ethylene dibromide.

Rapid advances have been made in regard to studies on cold storage and the optimum cold-storage conditions have been determined for several food products. The freezing of fruits and vegetables and their preservation in the frozen state has been attempted with success. The effect of plant hormones in inhibiting the sprouting of potatoes is being investigated.

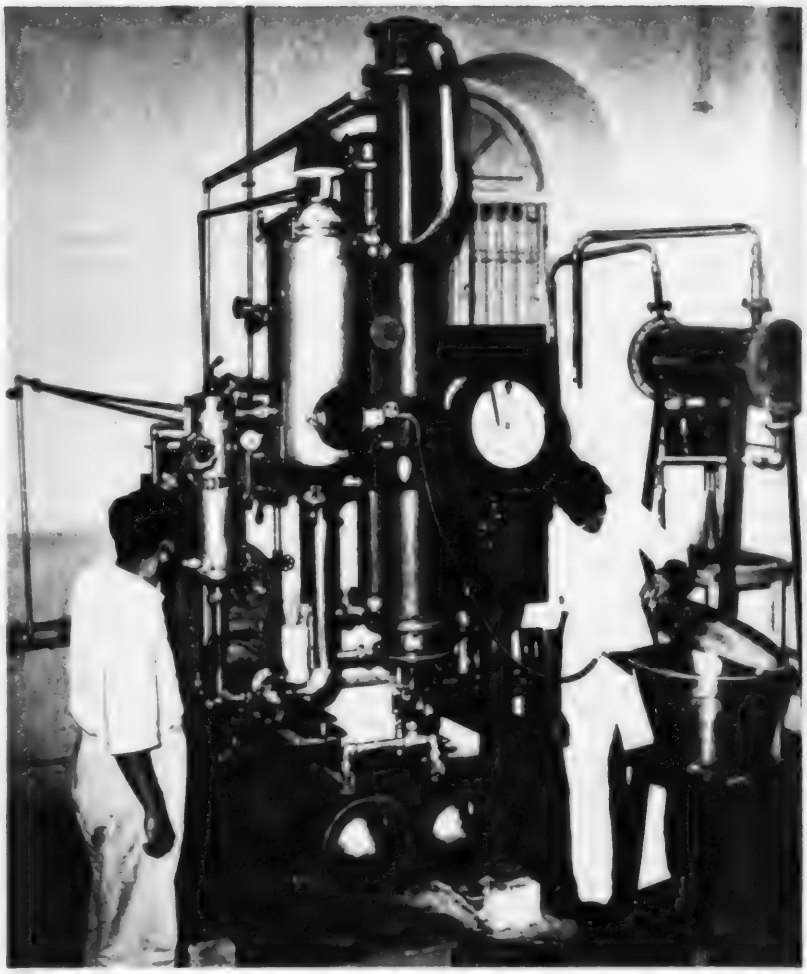
A method has been evolved and patented for the preservation of cashew kernels. The kernels are roasted or deep-fried in hydrogenated groundnut oil and stabilised with antioxidants. The kernels have been found to keep well for about a year when packed in sealed tins and stored at ordinary temperatures.

Fruit technology

Research on fruit technology is aimed at the development of techniques for processing Indian fruits and vegetables, and the preparation of new processed products from indigenous fruits and vegetables which have not so far been exploited industrially.

Methods for canning different fruits and vegetables have been standardised. Tender shoots of bamboos which grow wild in Indian forests have been processed into pickles, chutneys and candies. During processing harmful ingredients present in the shoots are completely removed. A variety of products has been prepared from cashew apples, bananas, papayas, passion fruit and other fruits. Special methods for preparing fruit juice powders and concentrates have been evolved. A technique for eliminating the bitter after-taste and off-flavour associated with orange juice and squashes has been developed.

An edible starch has been prepared from a new source, the banana stem, which is usually thrown away after the cutting of the banana bunch. Each stem yields 2-5 lb. of starch and it is estimated that with a suitable variety a ton of starch can be obtained from 1 acre of banana plantation containing about 700 clumps. The starch can be used for the preparation of custard powder as well as for industrial purposes.



All stainless steel forced circulation vacuum evaporator designed and fabricated at Ceftri.

Agave syrup

The analytical and microbiological work of Indian and foreign fruit products under the Fruit Products Order of the Government of India is being actively pursued.

Experiments on the agave plant (*Agave Vera Cruz*), which grows in semi-arid conditions and is commonly used for fencing in India have revealed that the tuberous portion of the plant is rich in polyfructosans. Scientists at Ceftri have converted the polyfructosans, by a simple process, into fructose syrup—a very sweet and non-crystallisable syrup of special interest to the confectionery industry.

The search for new beverages has resulted in the standardisation of many new products such as ginger cocktail, cheap tonic wines and vinegars, cashew apple juice and coffee products.

Coffee research

Work has shown that the flavour of coffee is best preserved when the coffee brew is prepared in glass and stainless steel filters. Brass filters modify the aroma of coffee, but tinning gives better results. A "wetting technique" has been developed whereby it is possible to obtain an extra eight to ten cups of coffee per lb. Filters of improved design for household use have been suggested

and will shortly be made available to the public by the Indian Coffee Board.

Tentative standards for coffee have been proposed after analysis of a large number of samples collected from different coffee-growing areas. It has been found that coffee husk which contains 2 to 6% caffeine can be used as a substitute for chicory. Work on the preparation of liquid concentrates and soluble coffee powders is in progress.

Protein foods

Ceftri has made other efforts in diverse ways and standardised conditions for the preparation of various products. For instance, it has prepared a few types of infant, invalid and other tonic foods. A low-cost protein food, similar in nutritive value to the multi-purpose food of the Meals for Millions Foundation, has been prepared from groundnut-cake flour and roasted pulses. Fortified with essential minerals and vitamins A, D, E and B, and costing only about eight annas per lb., this protein food will be a boon to the millions in India.

The public can enjoy all the food elements essential to human well-being at a low cost by using another highly-nutritious protein food evolved at the Institute. Prepared in the form of grains, rods and flour, it contains 25% proteins and a fully-balanced complement of carbohydrates, minerals, vitamins, etc. Trials with hospital patients have shown that the food is especially useful in wasting diseases and during convalescence.

Another type of tonic food developed at the Institute is called "Sustovita." It contains casein, a high class dietary protein, vitamins and minerals essential for bodily needs. It can be used as a food supplement in cases of general debility, and given with profit to children, expectant and nursing mothers and others.

Other activities

On the subject of solvent extraction in which the edible oil industry is keenly interested, the contribution of the Institute has been the development of an improved process, based on the use of absolute alcohol, which has several advantages. The Institute conducts a post-graduate diploma course in Fruit Technology and elementary and advanced classes in French and German.

The Division of Information and Statistics answers several enquiries every day. They come from housewives who want to learn something about different fruit and vegetable preparations, from industrialists who want to buy the patents of different products and others interested in the proper utilisation and conservation of food materials. The Information Division issues a monthly bulletin and has an extensive publications programme. It has also a foreign languages unit which makes available to scientific workers and the industry the latest research on food technology found in foreign journals. The Information Division holds exhibitions, symposia and meetings and thus carries the message of better food to the people.

Baby Food Manufacture

BABY FOOD manufacture consists essentially of a series of kitchen operations conducted on a large scale according to J. F. Kefford (*Food Preserv. Quart.*, 1955, **15**, (1), 8-11).

In the manufacture of strained pears, a typical fruit product for infant feeding, ripe pears are thoroughly washed, ground and passed through a steam blancher to inactivate enzymes which might cause browning. The blanched product is pumped into digesters, sweetened and cooked briefly to about 180°F. It is passed to a paddle type finisher from which it emerges as a smooth purée. This straining operation is the essential step in baby food processing. The sizes of the screen openings vary from 0·020 to 0·060 in. The strained product is pumped to holding tanks from where it passes to the bowl of a plunger filler. The filled jars are vapour-vacuum sealed and retorted in water for 8 min. at 225°F. They are pressure-cooled to 130°F. centre temperature and air-cooled.

For a vegetable and bacon pack, the ingredients are prepared by hand or in peeling machines, chopped coarsely in hammer mills, mixed in their correct proportions and cooked to approximately 180°F. After this the product may be canned either as a junior food with no further sub-division or as a baby food, strained as described above. The cans are then retorted, cooled and packed as before.

In the manufacture of strained meats, raw meat is boned and trimmed so that the average final fat content of the food is below 4·5%. The meat is chopped, milled and salt added to a level not greater than 0·5%. The product is cooked, strained and filled into 3½-oz. cans, which are vacuum-sealed and retorted. Chopped foods are not milled but are diced into ⅜-in. cubes and filled into 5-oz. cans.

Cereals foods consist of a cereal product with such admixtures as dried skim milk, dried yeast, wheat germ, calcium phosphate, sodium iron pyrophosphate and salt. The ingredients are precooked in pressure digesters, strained, drum-dried, flaked and packed in cartons.

The most popular containers for processed baby foods are 3½-oz. and 4½-oz. cans and 5-oz. and 8¼-oz. jars. Cans are usually internally lacquered.

One packaging problem in glass-packed foods is the darkening of the food in the headspace of the jar due to oxidative reactions. This can only be controlled by limiting the amount of oxygen in the container. The darkening is catalysed by iron and copper concentrations around 10 p.p.m.

Machines and Materials for the Baker and Confectioner

What to see at the 44th International Bakers' and Confectioners' Exhibition

Chocolate enrobers, dough moulding machines, potato peelers, colours, flavours and packaging materials are among the products displayed by more than 150 firms at the 44th International Bakers' and Confectioners' Exhibition at Olympia this month. Here is a summary of some of the main exhibits.

Demonstrations and competitions

SET amongst the exhibition of plant, equipment and ingredients, is what is thought to be the most representative international collection of confectionery ever shown.

From Britain there are the traditional displays of bread and confectionery entered in 162 competition classes. Demonstrations of bread-making and cake decoration are being given by students, operatives and apprentices in their own working bakery. The British Baking Industries' Research Association is also holding demonstrations of bread-making and the British Confectioners' Association is providing a display of confectionery. There is also an exhibit by members of the Institute of British Bakers.

The International Richemont Club is staging a display of confectionery showing the craftsmanship of several nations. Underlining the importance of the exchange of international ideas and the value of studying continental confectionery is the International Display contributed by six national confectionery associations.

The Place: Olympia, London, W.14.

The Time: Saturday, October 1, to Thursday, October 6 (except Sunday), from 10 a.m. (noon on opening day) to 7 p.m.

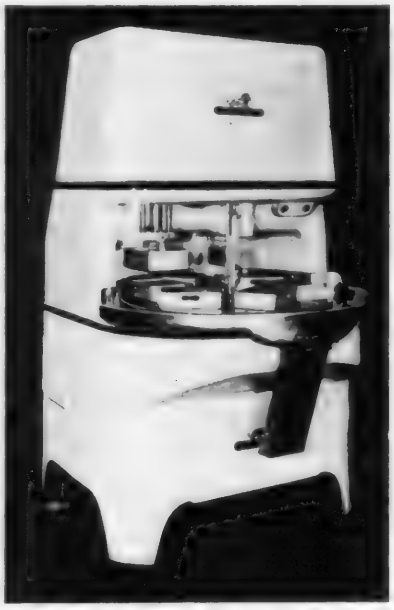
Admission: Trade—2s. 6d. General—5s.

How to Get There: By underground train to Kensington, Olympia (District Line). By bus: Nos. 9, 27, 28, 49, 73, 91.

MACHINERY AND EQUIPMENT

Exhibiting for the first time are **Kek Ltd.** (*Row S. Stand No.* 1), who are demonstrating the reduction of granulated sugar to icing sugar with the No. 4 Kek mill to prove their contention that many bakers and confectioners could save money and improve their products by pulverising their own sugar. The company claim that with slight modifications the mill can also be used to grind almonds, bananas, coconut, crab breasts, gums, hazel nuts, nutmegs and several other materials.

Other exhibits on this stand are a 10-in. kibbler and a rotary valve. The kibbler is said to be an ideal granulator for almonds and several other nuts, while the rotary valve is claimed to be a perfect air lock and is designed for charging or discharging a vessel under slight pressure or vacuum.



A pie and pastry moulder made by Peerless and Ericsson which they claim can mould, fill and lid from 1,000 to 4,000 pieces per hour.

The current trend towards bulk flour handling and storage should make the stand of **Henry Simon Ltd.** (*Row P. Stand No.* 3) of particular interest. Models of recently completed Simon bulk flour and storage installations are on display, including the Hovis Mill warehouse at Manchester and McVitie and Price's plant at London. There is also a model of the unloading arrangements at a mill for loading a Simon bulk flour delivery wagon. The company are showing their *Aeroflow Multiway* valve, designed for remote control and used in high concentration conveying lines for directing the flow of material to one of a number of points. The valve may be used for distribution to silos from a single bulk intake pipe, blowing material from silos to process machines and for joining feed for several systems to a single feed line.

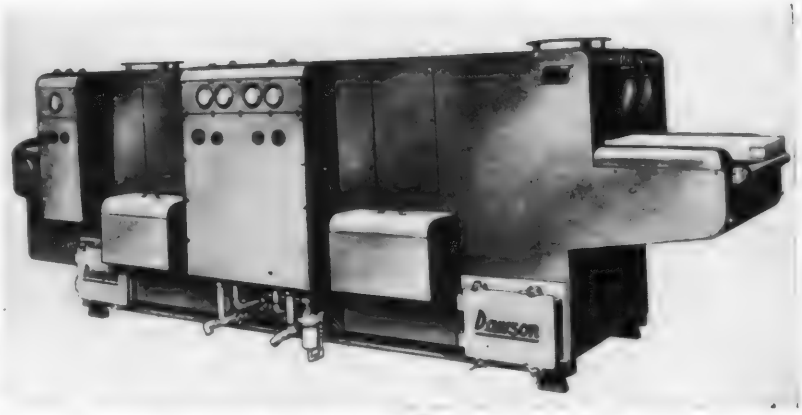
Other machines on the same stand include the *Entoleter* impact mill (for flour disinfestation, particle size reduction and centrifugal mixing), the Type D *Velofeeder* vibratory feeder and the *Junior* sifter. The latter has been designed as a small, flexible sifting machine for screening and grading powders at an economic throughput. It has eight sieves, totally enclosed in a metal case which is suspended from a frame by canes. The sieve case is rotated by a driving mechanism fitted under the box. Since it is totally enclosed, the machine is dustproof.

The company are also displaying a wide range of laboratory

equipment including the *Research* dough strength testing equipment and the Simon Extensometer. The latter has been recently adopted by the British Baking Industries Research Association for testing flour samples of varied origin and unknown treatment.

Electrically-operated equipment suitable for a typical medium-size bakery and confectionery business is featured by the **British Electrical Development Association** (*Row D. Stand No.* 1). On display are a bakers' peel oven, a scone plate, a bun divider, a doughnut fryer, a cake mixer, a 100-gal. water heater, a refrigerator, a bread slicer and wrapper, a chocolate enrober, a power pastry roller, a pastry oven and an electric hand dryer. The stand has been mounted with enlarged photographs supported by showcards indicating the advantages of electricity.

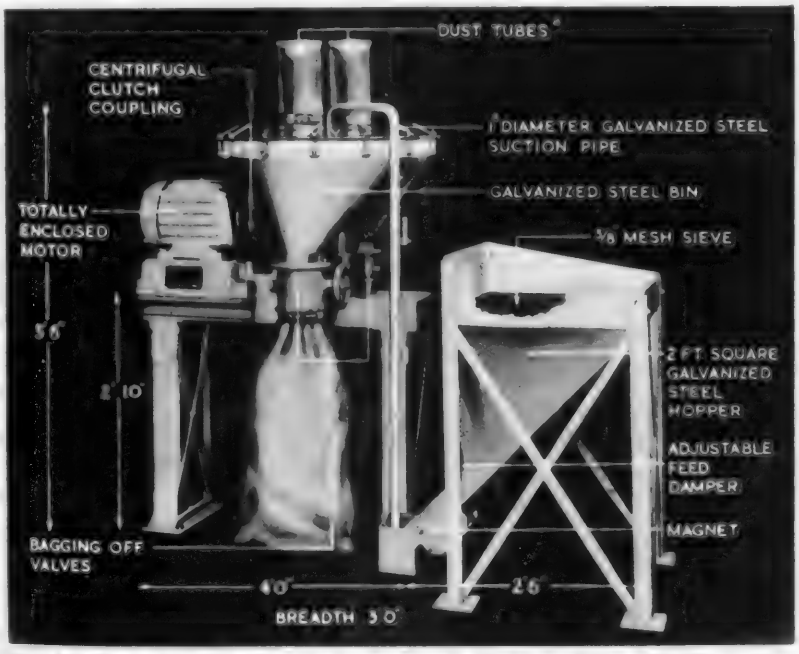
In addition to their plastic chocolate moulds, flavouring essences and colours, the **Confectioners' Vegetable Colours and Fruit Essences Co. Ltd.** (*Row S. Stand No.* 5) are exhibiting the Nielsen *Baby* and *Junior* sizes chocolate enrober and a Nielsen fondant enrober. The *Baby* size enrober is a 7-in. coater specially designed for continuous production. It is said to have a daily output of about 400 lb. of coated pieces of various shapes. The *Junior* model is a 12-in. coater which can be adjusted for single or double chocolate curtain. It has an output of about 800 lb. of coated pieces daily. The Nielsen fondant enrober is electrically heated and thermostatically controlled. Advantages claimed for the machine are that it is cheap to run, requires only one attendant, needs little space, the pump conveyor and distributor are easily removable for cleaning, and a quick change over for different coloured fondant is possible.



For the medium sized baker and confectioner Dawson Bros. Ltd. have produced the Type T.1 tray washing, rinsing and sterilising machine. It has a capacity of up to 300 trays per hr.

Machines for cutting and slitting bakery products are featured by **J. Crollie and Son Ltd.** (*Row D. Stand No.* 2). Many bakers now run a regular line of cut and wrapped sponge sandwiches and the *Segmenta* sponge divider has been designed for this purpose. It is a hand-operated machine that is claimed to cut any size of round sponge sandwich up to 7-in. diameter in eight equal segments. If required, only the top half of the sandwich need be cut. The same company are showing the *Multi-Secta* slab cake slicer, a power-operated machine for dealing with all forms of cake from plain Madeira to heavy fruit slabs. Sizes of cake up to 22-in. × 8-in. × 3¾-in. can be accommodated, and these can be cut into portions of 2 lb., 1 lb., ½ lb., and so on according to requirements. Slitting the cakes into layers for spreading jam or cream can be carried out on another Crollie machine, the *Auto-Slitta*. This has been used for some years for slitting sponge sandwiches, but the adjustable live top web on the new machine makes it possible to slit heavy slab cake, Madeira, Genoese and Angel cake.

A single section, direct gas-fired bread and confectionery oven is the main exhibit on the **Spooner Food Machinery Engineering Co.**



Granulated sugar can be reduced to icing sugar in this No. 4 Kek mill. The makers say that with slight modifications the same machine can grind almonds, banana, coconut, crab breasts, gums, hazel nuts, nutmegs and other materials.

This model of Advita's stand shows the main display piece. This display is completely animated from the three dimensional model baker who will point out the advantages of using G.M.S. in the bakery, to the five figures on the background. The reception area and information desk are not shown.

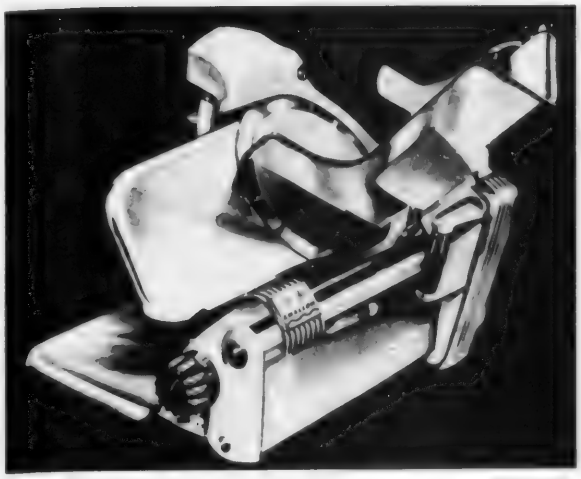
stand (*Row E. Stand No.* 2). The B.72 New Series oven uses the Spooner system of heating by forced convection and is built on a unit construction system so that additional sections can be added to provide for expanding trade. A self-proportioning burner is employed with electrical ignition, fan and flame failure protection, and push button control. Supporting exhibits on the same stand are the *Egerton* confectionery depositer, capable of depositing variable weights up to 5 oz. at rates up to 72 drops per min. and the *Aquatemp* water metering and tempering machine. This has been designed for the automatic delivery of accurately measured quantities of doughing water at a pre-determined temperature. The quantities are preselectable up to 36 gal. and the machine has a reproducible accuracy of ± 2 fl. oz. The display also includes diagrams of the Spooner heating system and photographs of other of the company's products.

Dough moulding machines and chocolate and fondant enrobers are being shown by **Sorensen Bakery Equipment Ltd.** (*Row D. Stand No.* 6) including their *Choco-Master* enrober. This is a small-scale machine with a daily capacity of about 540 lb., which operates on the same principle as bigger machines for the mass production of bakery products. It can be controlled to give all forms of covering. A dough moulder is shown which will handle continuously dough pieces weighing from 1 oz. to 4 lb., and is made in three sizes.

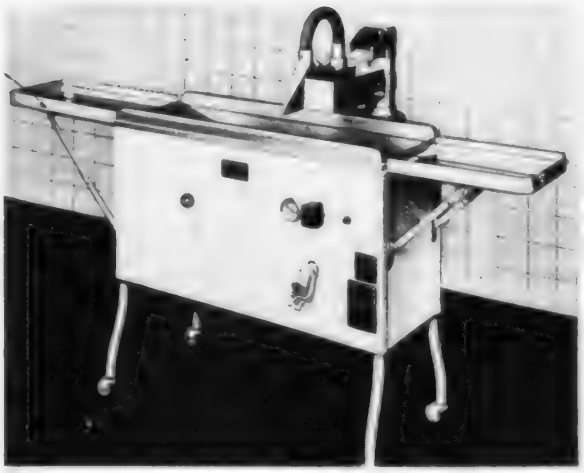
Tray and jar washing, rinsing, sterilising and drying machines and dish washing machines are being exhibited by **Dawson Bros. Ltd.** (*Row D. Stand No.* 4). They include the vertical tray washing machine with a capacity of up to 1,000 trays per hr. and the type T.1 machine with a capacity of up to 300 trays per hr. which works in much the same manner as the larger machine without the tray drying operation. A one-operator jar washing, rinsing, sterilising and drying machine (capacity 400 jars per hr.) is provided with a specially designed carrier to locate the jars two wide.

A re-designed version of their *Little Champion* pie machine is being displayed by **John Hunt (Bolton) Ltd.** (*Row E. Stand No.* 8). It is claimed to considerably reduce the pressure required when forming shells of pastry and so increase the production rate. The same company are showing

Over 70 ft. long the Craigmillar and British Creameries stand incorporates a demonstration theatre holding 35 people, as well as displays of the company's products.



Meat, sausage, bread and many other foods can be handled by this electric gravity feed slicer, according to the makers Swift and Swallow Ltd. The operator is protected by a special safety device fitting over the blade.



One worker can operate the Nielsen fondant enrober, sold in this country by The Confectioners' Vegetable Colours and Fruit Essences Co. Ltd. The enrober can be quickly changed for different colours.

for the first time a new type of electric potato peeler, with a 7-lb. capacity. In addition they are showing a new type of bun moulder, a tongue slicer and an attachment for dicing which can be operated on the company's range of *Duratax* cake mixers.

Swift and Swallow Ltd. (*Inner Row, Stand No.* 5) are showing their 20 qt. and 30 qt. mixers. These machines have a specially strong whisk and dough hooks for light and heavy mixes. Grating, shredding, slicing, etc., is said to be quickly and easily accomplished. The Swallow electric gravity feed slicer is also being shown. It will handle all kinds of cooked or uncooked meat, sausage, bread, vegetables, fruit, cheese or fish. A special fitting over the blade protects the operator. Swift automatic and semi-automatic scales on display include the 4 lb. Light/Heavy for pre-packaging of goods and the "Sealed" scale for use in floury atmospheres without clogging up

On view for the first time is the streamlined Hobart mixer, model S.E.302, a 30 qt. model with a synchro-mesh gear box. Other mixers displayed by the **Hobart Manufacturing Co. Ltd.** (*Row D. Stand No.* 7) are in capacities from 10 to 80 qts. Air cream whips in two sizes, power and hand-operated pastry rollers and bakery tray washers are also on view. In the catering section Hobart present fully and semi-automatic dish washers, gravity food slicing machines and coffee grinding machines. A range of potato peelers from a small portable model of 7 lb. capacity to the largest 28 lb. capacity model with built-in peel trap is also shown.

In their exhibit the **Gas Council** (*Row C. Stand No.* 2) show how the modern baker can combine his bakery and customer-service space on the open plan principle. Their main feature is a coloured gas-heated oven by Cox Ovenbuilders Ltd., which forms a background to the serving counters of a mock-up baker's shop. Nearby are fixed a doughnut frier, a fondant heater and a refrigerator—all operated by gas and all sited so that customers can see "the works." General bakery equipment also takes its place to show how everything fits into the plan.

On another part of their stand the Council are displaying a fully-automatic coke-fired oven by G. R. Gilbert Ltd. Capable of turning out 280 standard large loaves every 45 minutes, this oven can be switched to the production of cakes, confectionery, pies and pastries.

A new bread moulding machine is being exhibited by the **Record Bakery Equipment Co. Ltd.** (*Row B. Stand No.* 5) which they say will be suitable for plant bakeries as well as small and medium sized establishments and will handle all types of doughs up to a maximum of 4-lbs. The new moulder is claimed to be suitable for dealing with National, *Hovis*, *Procea* and wholemeal doughs, as well as doughs made from rye flour. The moulding process of the *Record* Exhibition bread moulder is based on the simultaneous stretching and coiling of the dough, which is given a final mould in a delivery chamber.

Peerless and Ericsson (*Row F. Stand No.* 2) are introducing the *O'Matic* Major, an addition to their pie and pastry moulder range, which they say will mould, fill and lid 1,000 pieces per hr. of up to 10-in. dia. and 3-in. depth or alternatively, with its quadruple die, will mould 4,000 pieces per hr. of up to 5-in. dia. The stand, which shows the complete range of Peerless bakery machines, includes a working bakery with *O'Matic* Majors in operation and *Bruin* the automatic tea brewer and dispenser.

MATERIALS

Among the bakery materials at the exhibition are the range of emulsifiers on the **Advita Ltd.** stand (*Inner Row, Stand No.* 35).

Particular emphasis is placed on glyceryl monostearate on this stand, including Advita's two grades of G.M.S., *Admul*, which has a minimum of 32% monoglyceride content and is used for bread production and cake formulæ, and their new distilled product *Hymono* which contains 90% monoglyceride and has a specific application in sponge production.

The newly developed *Vactell* range of extracts, fruit concentrates, baking and custard powders are displayed by the **Birmingham Chemical Co. Ltd.** (*Inner Row, Stand No.* 13). The concentrates are specially featured by way of sample fruit flans filled with confectioner's jelly in which the flavouring consists solely of concentrated fruit juice. Visitors to the exhibition are invited to sample these flans.

G. Havinden Ltd. (*Row T. Stand No.* 1), sole distributors of Clark's caramel and sugar products, are demonstrating the stages in which caramel and speciality bakery sugars are prepared from raw sugar and the various uses of speciality caramel and sugar products. Besides bakery caramel and caramel powder they are showing *Mocha D* and *Carameleff*, two flavoured caramels for use in cream fillings, fudge toppings and for flavouring cakes, sponges and biscuits;

Although bread wrapped in cellulose film has not "caught on" in this country to the same extent as in the U.S.A., South Africa and on the Continent, this small malt and honey fruit loaf is said to have sold exceptionally well since being wrapped in cellulose film supplied by Transparent Paper Ltd. The bakers are Stevens Bakery Ltd.

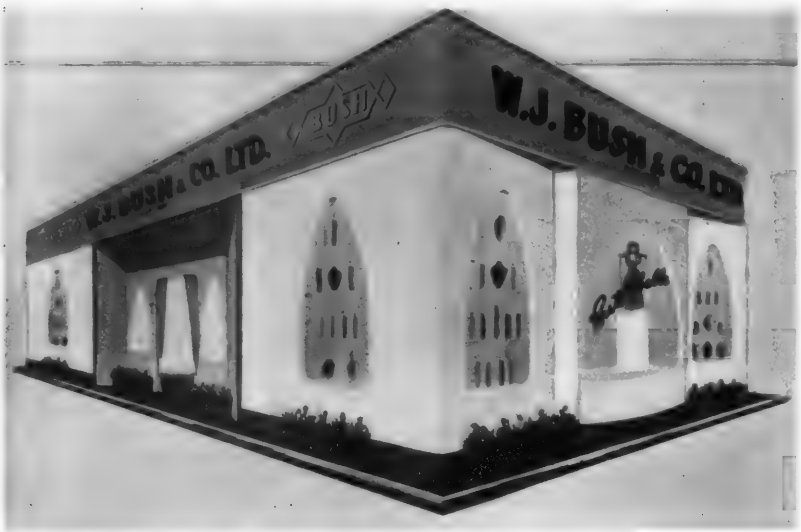
Puratose, a natural sugar improver for cakes, and *Barbsyrup*, which has a raw sugar flavour and is intended for all types of ginger cakes, ginger biscuits, parkins, etc. Visitors are invited to try the samples displayed.

One of the larger stands at the exhibition is that of **Craigmillar and British Creameries Ltd.** (*Row I. Stand No.* 2). Set on an island site over 70 ft. long, the stand incorporates a fully equipped demonstration theatre, a counter for tasting goods based on the company's major products, including *Marvello* and *Dolphin* margarine and *Silkit* white shortening. A special display features *Hymo*, a speciality fat for high-sugarcakes. This is intended, *inter alia*, to show how attractive display can help the baker to sell more.

The principal products displayed by **W. J. Bush and Co. Ltd.** (*Row C. Stand No.* 5) are flavours and colours which have a special appeal to the baker and confectioner. They comprise the No. 1 and *Green Label* series of flavours and the *Combinene* series of colour and flavour compounds. Among their exhibits are *Buttabelle*, the butter flavour now available in various qualities and essence vanilla. The company is also showing *Smoothex* self-emulsifying glyceryl monostearate in fine flake form and cream of tartar, B.P. Colour exhibits include harmless food colours in powder and liquid form and complying with the latest specifications.

Granary bread—a brown loaf made from complete granary meal—is being shown by the **English Grains Co. Ltd.** (*Inner Row, Stand No.* 22). This meal contains a high percentage of special flaked malt which is said to give the bread an unusual nutty flavour and high nutritive value. The company claim that because of the moisture-retaining properties of malt, granary bread stays fresh for several days after baking.

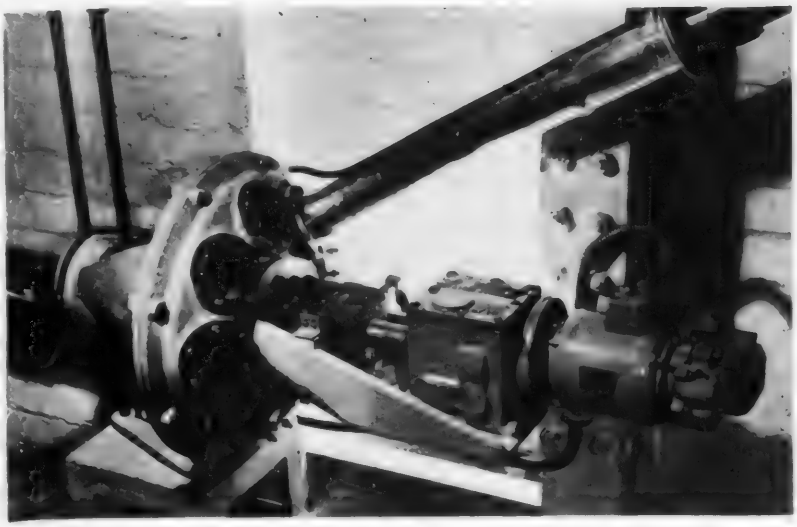
In addition to their main product, *Soyolk*—processed, full fat soya flour—**Soya Foods Ltd.** (*Inner Row, Stand No.* 7) are displaying a defatted soya flour with a fat content of 1% but a high protein content of 50%. Soya lecithin, soya oil and *Diasoy*, unprocessed soya flour, are also being shown. The company is holding demonstrations from time to time, aimed at showing how savings in costs and improved keeping quality of bakery goods can be obtained by the use of soya flour.



An artist's impression of the W. J. Bush stand which displays a range of harmless food colours—powder and liquid—with a special appeal to bakers and confectioners.

PACKAGING

Protective and decorative wrappings for the baker and confectioner are being shown by **Transparent Paper Ltd. and Clear-Pack Ltd.** (*Outer Row, No.* 35). On display are various grades of *Diophane*—non-



Designed for the remote control of bulk flour handling systems, the Simon Aeroflow Multiway valve is used in high concentration conveying lines for directing the flow of material to one of a number of points. Among its uses is the distribution of material to silos from a single bulk intake pipe.

moistureproof (P.T.), moistureproof heat-sealing (L.S.T.) and semi-moistureproof heat-sealing (L.S.A.T.)—with illustrations of their special uses. Demonstrations are being given of methods of heat-sealing *Diophane* in the wrapping of cakes, sandwiches and open-topped cartons. Part of the stand is devoted to the company's new *Diophane* laminate—called *Diolam*—which makes possible a sandwich print which retains the natural gloss of the film while allowing the direct wrapping of food.

British Cellophane Ltd. (*Row Q. Stand No.* 2) are featuring applications for moistureproof, partially moistureproof and non-moistureproof grades of *Cellophane* and the different types of pack that can be made from them. Much of the film shown is in converted form, *i.e.* in printed and unprinted bags and printed sheets. This is the work of Colodense Ltd., a subsidiary of British Cellophane Ltd. Demonstrations of the applications of *Cellophane* are being given, including the use of the B.C.L. wrapping aid, designed specially for the baker and confectioner, and said to be particularly suitable for wrapping open-top cartons without turning them over.

A large range of printed and plain boxes and trays for the confectionery trade is being shown by **Hunt Partners Ltd.** (*Inner Row, Stand No.* 17). Apart from examples of printing by traditional letterpress and litho processes, they are displaying samples of their *Velvetone* process for high quality reproduction on long runs, and their H.P. process for smaller runs where a more simple style of print is required. They are also exhibiting a range of all over decorative background designs and window cake boxes.

MISCELLANEOUS

Their weekly towel hire service is the theme of the **Spring Grove Laundries Ltd.** exhibit (*Inner Row, Stand No.* 6). The range of towels is shown on a side wall of the stand by a flight of large mounted towels flying through the air and captioned "The High Flying Towels with the Down to Earth Service." Under the hire service each customer gets 3 sets of his requirements—one for use, one for stock and one "in the wash"—without capital outlay. The company guarantees free repairs and replacements of the towels.

To prevent the danger of buttons becoming detached from garments and entering the "mix," **Clares (Wells) Ltd.** (*Row S. Stand No.* 4) are showing a simple one-piece garment secured with a single tape.

Kitchen Chemistry

Kitchen and laboratory terms appear cheek by jowl in the latest edition of a book designed principally for domestic science and home economics students.* Thus, in determining the pectic content of fruit juice, the student is directed to "add 15 c.c. of the juice to be tested," but in a following experiment is told to add ¼ cup of sugar to 1 cup of juice. Other recipes use both cookery book and laboratory quantities, *e.g.* in making gingerbread one uses 1 cup or 328 g. of molasses.

However, this is a minor criticism of a book which should be an excellent companion for the students for whom it is designed. The author has three aims: to present the chemical and physical basis, particularly that of colloid chemistry, of food preparation in a form suitable for use as a textbook; to provide a reference book on cookery; and to introduce students through the literature to those who have worked in this or related fields.

The relation of colloid chemistry to cooking is dealt with in the first chapter. Though the subject could, perhaps, have been treated at greater length, it is an admirable attempt to deal with a highly complex subject in relatively plain language.

The last edition was published in 1943, so that considerable rewriting and re-organisation of the material is apparent. The chapter on food preservation has been omitted and while some of the material incorporated in this chapter appears elsewhere throughout the book, other aspects of the subject, *e.g.* canning, have been omitted on the grounds that they have been adequately dealt with in other publications. A new chapter on food acceptability has been added, dealing primarily with sensory methods of evaluation.

The bibliographies collated at the end of each chapter are quite full and not too predominantly American.

* *Experimental Cookery*. By Belle Lowe. 4th edition. Wiley (London: Chapman and Hall). 1955. Pp. 573, incl. index. 60s. net.

A Nutritionist's Views on Food Additives and Food Labelling

By Edwin C. Owen, D.Sc.(London)

(Head, Biochemistry Dept., Hannah Dairy Research Institute)

During the past year the question of food additives has become highly topical. Proposals for a permissible list of food colours are being considered by the Government, and the food industry has been discussing the desirability of establishing a biological testing station for additives. It is against this background that the author, a nutritionist, puts forward his own strictly personal views on food additives and food labelling. We invite readers to send us their comments on this important subject for publication.

FRESHNESS in food is a great stimulus to appetite. Food which has suffered a minimum of human intervention has an appearance whether cooked or raw which is often a valuable guide to its palatability in dishes prepared from it. People have therefore come to expect that certain foods should have characteristic colours and flavours. These conceptions have become part of the language in such descriptions of articles other than foods as milk-white, apple-green, cherry-red, salmon-pink, chocolate-brown and olive-green to name but a few.

Cooking, salting and fermenting of foods are also age-old processes which change not only the flavour of foodstuffs but also their colour and nutritive value. Smoked fish is an ancient delicacy and we expect kippers and smoked haddock to be coloured by the smoke used in curing them. The yolks of eggs have a rich orange colour provided the hens which laid them had access to plenty of greenstuff, either fresh or dried. The frequency with which the appetising red colour of boiled lobster occurs in exhibitions of studies of still life is perhaps more a tribute to the taste of the patron than to that of the artist.

However, it is not possible today, nor was it possible in the past, to feed all the people all the time on genuinely fresh food. For we live in times of urbanisation when many town children are quite grown-up before they discover the real origin of milk and many highly educated gourmets have not seen asparagus come out of anything but a tin. Indeed, all of us every day eat so many foods which have been processed before they reach the household that we have to a large extent lost contact with the criteria by which food used to be judged as good and fresh. It therefore has become an important prerogative, privilege and duty of those who are expert in food-processing and manufacture to see that the criteria by which we judge our food do not become debased and to see that, though changed by civilisation, they are changed preferably for the better or at any rate not for the worse. Food processors therefore should consider it their duty to make colour and flavour indexes of nutritional value and not just means of camouflage. How different is a real custard made from fresh milk, fresh eggs (with golden yolks) and sugar, from its modern imitator in both nutritive value and specific dynamic action.

Colours

I would like to mention a few guiding principles which I would like to see adopted by all who process food, whether in the factory or in the kitchen at home. Firstly, food should not appear fresh unless it really is fresh. Live dried peas regenerated by soaking overnight are not bright green. There is therefore no reason why canned peas should be made by artificial means to appear bright green. Natural greenness, due to chlorophyll, is an indication that the food showing it contains the nutritionally indispensable but colourless vitamin C, which growing children especially and adults also need. If the greenness is due to an added synthetic dye or even to an added natural pigment such as chlorophyll, the index of vitamin C content has been lost.

The Ministry of Food in its "Recommendations relating to the use of colouring matters in foods" (H.M. Stationery Office, 1954) stressed such considerations as the above and in referring to the age-old practice of food colouring, said: "Colours were probably first introduced into foods to mask a deficiency of ingredients such as eggs, butter, chocolate and fruit, or to improve the appearance of some product the original colour of which had deteriorated during manufacture. Their main purpose today is to give a more attractive appearance to foods." Modern nutritionists sense a possible danger in this latter development which some of them have described as "food cosmetics." In ancient times little harm could result from the colouring of foods because the most readily obtainable colours for the purpose were natural vegetable or perhaps more rarely natural mineral or animal pigments and because the purification of foods was not then so extensively practised With the rise of the chemical industry a vast range of purified foods and of synthetic dyes and a vast range of inorganic pigments have become available. The temptation to use any of these for colouring foods should be strenuously resisted. Indeed, the use of many of them is specifically prohibited by law now, as pointed out in

FOOD MANUFACTURE, February 1955.

It is asserted in the Ministry of Food Report, already referred to, that certain foods such as confectionery and jam must be coloured to make them attractive. This is an assertion on which, surely, expert opinion is divided and most nutrition experts would be put off rather than attracted by highly coloured jams in which the colour may indicate the absence rather than the presence of the substance named on the label. Eggs from properly fed hens will make a cake which is light, nutritious and bright yellow. A similar appearance may be obtained by adding a yellow dye to a mixture of flour, sugar, water, baking soda and flavour. The first cake is fit for young children, the other is not.

Labelling

In the writer's opinion it would be an advantage if manufacturers of all composite foods were under statutory obligation to state plainly on the labels of such foods the names and amounts of all the constituents in them. The honest manufacturer would, by such legislation, be protected against unfair price-cutting by purveyors of an inferior article of similar colour and flavour. This does not mean that carbohydrate-rich confections, cakes and preserves should not be sold, but that the customer should know what he is buying in terms of edible fat, first and second class protein and digestible carbohydrate. Everything in a made-up food should be declared plainly on the label. If the declaration is not made, then any efforts of nutritionists to educate the discerning public in the principles and practice of good nutrition are doomed to failure.

If certain sects in the community can have a guarantee that certain brands of margarine or cooking fat do not contain the fat of a specific animal, be it the pig or the steer, or do not contain any animal fat at all, surely the discerning member of the public has a right to know what he is being asked to eat and also to know where it came from. This right implies a duty on the part of the food trade to disclose all such vital nutritional information. It is not enough that the age-long adding of a certain substance to a certain food has never been known to cause ill health. As pointed out by Platt in the *British Medical Journal*, January 22, 1955, in an article entitled "Human nutrition and the sophistication of foods and feeding habits," there is no way of finding out whether a substance added to a food, either directly as a colour, flavour or preservative, or indirectly as a weed-killer or pesticide, is harmful except by doing a direct experiment on several different species of animals. We do not know the possible harm which may be done to the nutritionally uninformed, who already save money by eating a diet over-rich in carbohydrate, by enticing them to eat even more of such a diet by making it bright-coloured and artificially flavoured. If canned foods are to be exported to the tropics their content of protein is of paramount importance, for protein deficiency is a characteristic of tropical diets (J. F. Brock *et al.*, *Lancet*, 1955, **269**, (6886), 355).

The kind of meal which I like most is one in which almost every dish can be analysed into its nutritionally essential components on sight, from the knowledge which every nutritionist has of the composition in terms of protein, fat, carbohydrate, vitamins and minerals of many animal, vegetable and mineral foods which have not "suffered a sea change into something rich and strange." When presented with a sausage I am nonplussed. My only nutritional guide is the delectability of those manufactured by certain well-known firms, who charge more but who, I feel in my innocence, put more and fresher first class protein into their articles. When, during the war, I occasionally received a food parcel from North America, I was very pleased to see plainly printed on the labels of certain sweets the names of their constituents. It is good for nutritionally informed people to know that certain confections contain soya bean, peanut, coconut, dried milk or other sources of protein. Such confections do not upset the balance of carbohydrate to protein in the diet.

From the foregoing it must be evident that the present writer believes in the fullest and plainest possible labelling of all processed foods (not even excepting bread) and that he therefore welcomes the newly published recommendations that a list of permitted food additives should be statutory. He also believes that all additives should be named on the label of the tin or jar or bottle or wrapper so that not only the wholesaler but also the customer should know what he is eating. For there are surely as many intelligent customers at the receiving end as there are intelligent food mixers at the transmitting end of the pipeline which supplies the people's food.

In conclusion, may I say that the foregoing are my own private opinions on the subject of food additives and are sanctioned only by their being in accord with the facts of scientific nutrition as published in the world's nutritional journals.

The Author

Before taking over the biochemistry department at the Hannah Institute, which was then under the directorship of Dr. Norman C. Wright, C.B., Dr. Owen was in charge of the nutrition department there during the war. Before that he was on the staff of both the Rowett Research Institute and the dietetic department of Aberdeen Royal Infirmary. At that time Lord Boyd Orr was director of the Rowett Institute. When Dr. Owen first came to Britain from Western Australia he studied under the late Sir Jack Drummond at University College, London.

The first issue of *Bulk Flour and Storage*, a magazine published by Henry Simon Ltd. for free circulation, contains articles describing the Lyons bakery at Tottenham and McVitie and Price's factory. Both factories use bulk handling methods.

Heinz Plan a Glass-Walled Factory

This model of the new factory, made exactly to scale, shows the view from the south-west. The playing fields will be south of the employee services building, in other words off the picture to the left. This is approximately the view which will be gained by travellers on the main Wigan-Southport line.

SINCE H. J. Heinz Co. Ltd. announced plans for a new factory last November, sales increases have led to the original conception being considerably altered so that the factory will now have nearly twice the capacity first envisaged. The site of the factory, at Kitt Green, near Wigan, has been enlarged from 130 to over 150 acres. Several unusual features are being introduced into the design and layout of the buildings.

In general terms, the factory has been planned with three main features: a three-storied employee services building; a spacious main block, predominantly a two-storied building, for production, storage and warehousing; and a group of buildings comprising can-making department, workshops and power house. The combined floor area of the buildings will be well over three-quarters of a million square feet. Provision has been made for future expansion.

Each of these three main features will be linked to the others by a bridge. This is part of a scheme, described in greater detail later, which will allow personnel to circulate freely from one department to another without having to go into the open or to cross main roads or railway sidings.

KEY

1. Employee services buildings, forming the entrance to the factory.
2. Production section of the main building. The raised portions of the roof will house the ventilating equipment.
3. The remainder of the main building devoted to raw materials storage above and finished goods warehouse below.
4. Workshops and maintenance departments.
5. Can-making department.
6. Power house, with oil storage tanks behind. The small building to the left is the waste elimimnator.
7. Overhead runway for cans and steam services, etc.
8. Footbridge for personnel, continued on the northern side of the main building.
9. Forecourt to the canteen.
10. Cooling ponds.
11. Bicycle shed.
12. Bus shelter.
13. The ramp roads up and down to the raw material store and the finished goods warehouse.
14. Railway siding from main line.
15. Walthew House Lane in its diverted position.
16. Porters Wood, scheduled as a local beauty spot, part of which is now owned by the Company.
17. Unloading platform for raw materials.
18. Car park for visitors and employees.

Preliminary site work has now begun and, if building schedules can be adhered to, production should commence in 1957. In all probability the first products to be manufactured at Kitt Green will be some of the soup varieties followed by baked beans. The original estimated cost of the whole undertaking was £2,500,000, but this probably will now be exceeded.

Main building

The main factory building which will have a total floor area of 699,500 sq. ft will be basically two-storied. Half of the building will be given over to raw materials storage and the finished goods warehouse, and the remainder will be used for production.

The two floors of the production section will be separated by a mezzanine floor.

To the north and south of the main building and linked to it by bridges will be, respectively, (*a*) a group consisting of the can-making department, workshops and power house and (*b*) an employee services building. The can-making department and workshops are single-storey and are combined into one building with a total floor area of over 66,000 sq. ft. The power house will stand separately, forming a feature of the general composition; it will have a floor area of 21,000 sq. ft.

The employee services building may be considered as the entrance to the whole plant. In planning this building and the main block the architects, J. Douglass Mathews and Partners, have made clever use of the existing contours of the site. It will contain, on the lower ground floor, the canteen and kitchens and, on the main ground floor, cloakrooms and toilets for all personnel, medical and dental departments, personnel and 57 Club offices, staff sales shop and dressmaking department. The top floor will be for general offices and the whole building will have a total floor space of over 75,000 sq. ft.

The lower ground floor will be at ground level on the north and east fronts and the canteen will have a terraced forecourt commanding an open view eastwards over agricultural country.

The main ground floor will be at ground level on the south and west fronts, with direct access to the pavements in the bus park. From this floor, personnel, having changed in the cloakrooms, will proceed across a covered bridge to the main factory building where they will emerge on to the mezzanine floor.

Function of mezzanine floor

This floor which, as already indicated, divides the two storeys of the production section of the main building, is of special interest. Its function will, in general terms, be twofold.

In the first place it will provide a "circulation area" for personnel. From it, by means of suitably positioned stairways, there will be access to every production department. Thus, personnel will not need to pass through one department to reach another but will be able to go directly to the particular production area required through corridors and by the appropriate staircase. Situated on the mezzanine also will be the quality control laboratories, with plenty of natural light and, in addition to the circulation routes, rest rooms in which personnel will be able to enjoy their tea-break away from the departments.

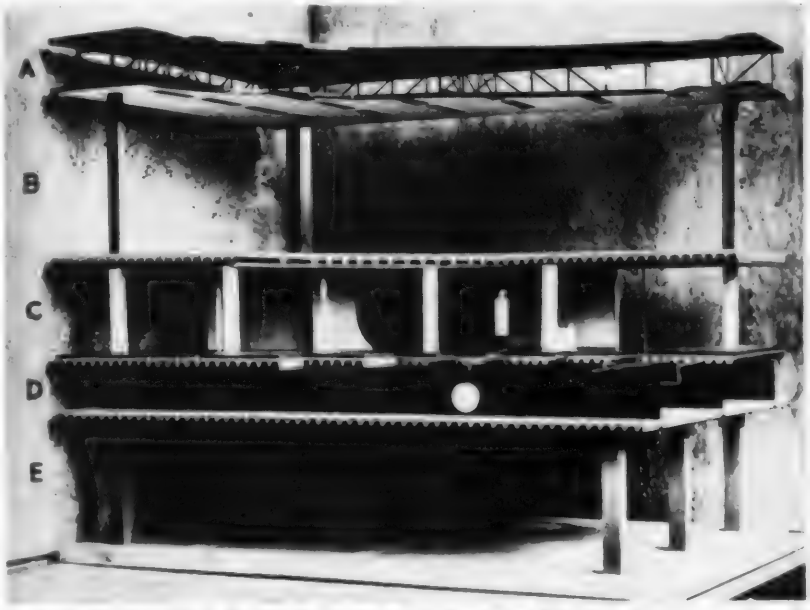
The second function of the mezzanine floor will be the accommodation of service equipment such as ventilating plant, electrical gear, duct work and so forth. This will have the effect of keeping the production departments free from much of the rather unsightly pipes and conduits, normally found in a traditionally-designed factory. The exit in the northern wall of the mezzanine floor gives on to another covered bridge by which personnel will gain access to the workshops, can-making department and power house.

Production flow

One of the most interesting features of the architect's plan is the full use he has made of the natural characteristics of the land in order to simplify as far as possible the complex nature of the processes in a factory of this kind.

The basic requirement of a vertical drop near the centre of the main production lines led to the conception of a two-storied factory. This requirement, however, presented the problem of how to deliver with ease the large tonnage of raw materials required at the beginning of the production process without the use of hoists or lifts which is a cumbersome method and very wasteful from the time factor point of view.

In dealing with this problem the rise in the ground level became a useful factor. A scheme was devised with the incorporation of



This sectional model is of one of more than eighty bays in the production section of the main factory building. It shows the basic method of construction, as follows.

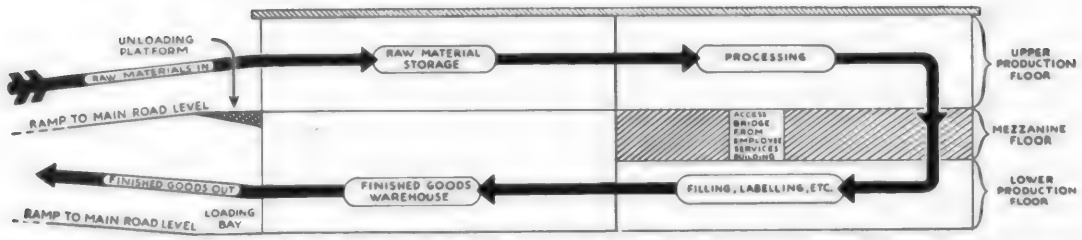
A. False ceiling in which duct-work and other services will be accommodated.

B. Processing floor—note the flush ceiling with inset lighting, free from surface pipes, etc.

C. Mezzanine floor for services, personnel circulation, etc.

D. Principal structural beams forming cavities for main services, such as water, gas, electricity.

E. Filling, sterilising, labelling and packaging floor.



The production floor planned for the new factory. By using natural land contours, vehicles will be able to unload at first floor level.

ramps which will enable all raw materials to be delivered by motor vehicles at first floor level. Thus the beginning of the "production flow" is established. The raw materials will move along the upper floor to the processing departments, the prepared ingredients will then be dropped through the mezzanine floor to the filling and labelling lines and pass straight out to the finished goods warehouse, which is situated below the raw materials storage department. From the warehouse the goods will be despatched either by train from sidings which will lead from the main British Railways Wigan-Southport line or by lorry up a ramp road to the main level.

It will be seen, then, that the production flow can be described as moving in a great loop in a clock-wise direction.

Glass walls

From the outside, the production section of the main factory building will give the impression of a structure clothed in glass. It will have glass "curtain" walls, as they are called, which will be protected by guard rails on the inside and will show daylight practically from floor to ceiling.

In all production areas a bright, airy and spacious effect will be achieved, with vast, flush ceilings, uninterrupted as far as possible by pipes, ducts, can-runs and similar services required for the machines. All this, as already indicated, will be accommodated as far as practicable in the mezzanine floor and will, as necessary, rise or drop in clean vertical lines to the upper or lower production floor. Even the fluorescent light fittings will be inserted flush into the ceilings. In other words, every effort will be made to keep the production areas free of dust-accumulating equipment.

That half of the main factory building designed for the raw materials store and finished goods warehouse will be constructed of brick. Here the effect aimed at will have an engineering quality consistent with the functional nature of this part of the factory.

The group of buildings comprising can-making department, workshops and power house will be in keeping with the main factory and will have in addition to traditional brick-work, a quantity of curtain walling, some fully glazed, some solid panels.

The employee services building will also conform to the general contemporary design and will provide a striking but business-like entrance to the whole plant.

Fish Processing—Old and New

Man's methods for keeping fish from earliest times to the present and possibly beyond, are the theme of this new book on fish preservation.* The author modestly describes his work as being based on spare-time reading against a background of specialist knowledge. However, it is evident that this spare-time reading—the author's references range from Boswell to *Food Science Abstracts*, from Izaak Walton to the Torry Research Station—has been wide and scholarly. As for his technological background, since Dr. Cutting is the Officer-in-Charge of the Humber Laboratory for Research in Fish Technology, this is unquestionable.

So far as we know, the book gives the first connected picture of the evolution of methods of preserving fish from earliest records up to and including present-day practice with a glimpse at the future. It is written mainly from British experience, but includes references to Africa, Asia and especially to North America, where the early history was largely bound up with fishing.

Preservation by drying, salting, smoking, canning, chilling and freezing is dealt with in its historical context, drawing freely on contemporary historical documents and literature. The relationship between technique and social and technological background is brought out in describing the course of development. In dealing with present practice, a comprehensive picture is given for the first time of all the preservation processes involved in the fishing industry. The technicalities of catching fish and fishery statistics have been avoided except when they have a bearing on the main subject.

The publishers are to be congratulated on the book's unusually high standard of production and illustration. Pictures have been borrowed from the Worshipful Company of Fishmongers, the Royal Thames Yacht Club, and the Hanseatic League, so that sailing ships, portraits, and coats of arms—many in full colour—relieve the more technical illustrations. The book is a "must" for everyone interested in fish.

* *Fish Saving—a History of Fish Processing from Ancient to Modern Times.* By Dr. C. L. Cutting. Leonard Hill (Books), Ltd., 9, Eden Street, London, N.W.1. 1955. Pp. 372, inc. index. Profusely illustrated. 42s. net.

A Comprehensive Theory of Food Preservation

THE connection between food and soil being so close, it is pleasant to note that a suggestive outline of the behaviour of micro-organisms in relation to food has emerged from work done on the physico-chemical properties of soil. In the July issue of the American journal *Ecology* (Vol. **36**, pp. 506-509), Prof. Hugh Nicol has presented a brief review of some ideas current since 1909 about the relations between *p*H, electrical conductivity, and other physico-chemical properties of solutions. The date 1909 was chosen because it was in that year that Sørensen introduced the *p*H notation. He was under the impression that strong electrolytes were only partially ionised (an idea now discarded). Many chemists will no doubt be surprised to learn that Sørensen did not initially *measure* *p*H electrometrically or otherwise—but calculated it, by simple proportion, from measurements of electrical conductivity.

Consequently, though the determination of electrical resistance or conductivity of solutions is not as prevalent as it might be, acknowledgment of the linkage between conductivity and *p*H of a solution is as old as *p*H itself. The phenomena of *p*H, electrical conductivity, osmotic pressure, and other physico-chemical manifestations in solutions are all interrelated. This inescapable fact has tended to be lost from sight until recently, but it has found fresh and striking development in the work of Mr. E. K. Schofield-Palmer, Dr. A. J. McGregor, and other chemists at the West of Scotland Agricultural College. In the light of their ideas, Prof. Nicol has shown how certain relationships can be concisely expressed as a continuous band or "spectrum" if one has regard to the conditions governing growth of plants or microbes in soil and other habitats.

Electrical conductivity is conveniently expressed as a negative logarithm, *p*C, analogous to the *p*H notation; the two can be combined in one expression. For a solution free from non-electrolytes, *p*C and *p*H together supply an integral which sums up the physico-chemical situation of the solution. By using *p*C, *p*H, and analogous notations relating to the free energy of water, all the physico-chemical conditions governing growth can be embraced by the "spectrum" given. One limit or edge of this spectrum is salt-free water; the other limit (varying slightly with kind of plant or microbe) corresponds to a *p*C value of about 1·55, and to an osmotic pressure of about 20 atmospheres.

In solutions having a salt content or total osmotic pressure much beyond that corresponding to *p*C 1·4, no ordinary kind of organism can grow. Organisms cannot, then, extract from their environment the water needed for vital activities including growth; if alive, microbes must vegetate or be dormant. Hence (Nicol has suggested) to formulate a comprehensive theory of microbial growth-reactions towards physico-chemical situations in foodstuffs or other aqueous substances, all that is necessary is to make the very short step across the limit of the spectrum from *p*C about 1·5 to still lower values: from growing to not-growing: and in terms of the free energy of the material.

Theory outlined

On this simple but quantitative basis, a theory of food-preservation is outlined in three main groups. Two of these (O and I) include aseptically drawn fluids (no microbes present); unheated fruit juice (microbes mechanically removed); wines and cask beer (microbes having exhausted a principal nutrient); and heat-treated foods (microbes inactivated by heat). The third group (II), which refers to reduction of free energy as the preserving factor, embraces all other methods of preservation (except by chemical addition, which is not considered): freezing, drying, addition of salt, acid, or sugar—for example.

The suggested classification does not make specific proposals for determining free energy in those foodstuffs which, unlike soil and natural waters, contain appreciable proportions of sugar and other non-electrolytes. For these, the unhandy exercise of determination of osmotic pressure must still be performed. *p*C and *p*H alone would apparently be suitable for characterising some manufactured products or materials used in food manufacture—for instance, vinegar and brine. In respect of most foodstuffs, however, no more can at present be claimed for the theoretical outline than that it may stimulate fresh thinking.

The most valuable feature of the growth spectrum may turn out to be that it puts *p*H into relation with certain physico-chemical properties, and stresses the interdependence of all such properties. It is no longer necessary to regard *p*H as an isolated determination incapable of being made to "add up" its information usefully with that provided by other measurements.

In many laboratories concerned with aqueous systems containing a solid phase, *p*H is the only physico-chemical measurement made. Since the physical properties are inter-related, there seems to be scope for linking, *e.g.*, refractivity with *p*H changes and other manifestations of free energy. Failing any such development from within the food industries, it still seems possible to derive new kinds of practical information useful for control purposes, or for assessing probable shelf-life and "keeping" or ageing qualities, from such old-established techniques as measurement of *p*H and electrical resistance, provided their results are suitably combined.

The revised, 1955 edition of the Yearbook of the Dutch Pastry, Rusk, Biscuit, Cake and Wafer Industry has been published, and is available free from B. H. Wellmann of Amsterdam. The introduction is in six languages including English, and a code—the key to which is printed in the same languages—makes it easy to find Dutch manufacturers of bakers' confectionery.

Old Time Potted Meats

By G. E. Fussell, F.R.HIST.S.

A HOUSEWIFE who lived in the reign of Queen Anne would have been dazzled indeed if she could see the shelves of a modern grocer's shop. The infinite choice of all sorts of articles now commonplace was quite unknown to her. Indeed if she lived in the country she doubtless had to travel on foot or on horseback to the nearest town before she could find a shop. Unless it was necessary to buy spices and other things not produced on the farm she stayed at home. She was the food manufacturer of that day.

The arts of preserving were well known to her so far as they were then understood. Keeping meat was a problem that was solved in the easiest way by hanging it in the chimney in the smoke of the wood fire. It was also brined and powdered. These operations were essential because meat supplies were never very plentiful except in the summer. Beasts were slaughtered in the autumn for lack of winter feed to keep them till the following year.

Richard Bradley, Professor of Botany at Cambridge in the reign of George II, said April was the time of year when potted meats began to come into fashion. I am not very clear why he thought so. It would have been more reasonable to put it a little earlier in the year because lambs must have been born some time before, and calves were usually dropped in April or May, but Bradley had doubtless some good reason for what he said.

Our ancestors were great men for fixing up one thing to look and taste like another. The story has been told of a London cook who made up rabbit like chicken. Bradley tells how to pot a leg of beef to imitate potted venison. This information was obtained from Col. Bradbury of Wicken Hall, and the respectability of its source suggests that a little cleverness of this kind was not to be frowned upon.

Potting a leg of beef

They didn't do things in a small way. The lady who began potting took a leg of beef to work upon. She was advised to skin it as whole as she could, cut up the flesh, season with pepper, salt and allspice, break the bones and take out the marrow to mix with the slices of beef, which had to be put in a deep earthen pot. Next she had to cover the whole with the skin and lay the bones over that, covering all with paper and tying down close. Thus prepared she baked it with "great bread" (I confess this defeats me) and let it stand in the oven all night. When this had been done the bones and skin were removed, and the liquor strained off. Then the meat was put in a wooden bowl and beaten as small as possible with a wooden pestle. As this was done the lady added some butter and some of the fat of the marrow which she would find swimming on the gravy. Great care was necessary to see that no gravy got in. When she had beaten the mixture to the consistency she wanted the cook buttered the bottom and sides of the pan in which the meat was to be kept. The crushed meat was put in this pan, probably earthenware, and pressed down as hard as possible. Finally it was covered with melted butter. Nothing is said of any other covering.

By this method venison, mutton or any other flesh could be potted and would keep good for several weeks. Bradley warned his readers that only the fleshy or muscular parts should be used in this way; that they must be seasoned and baked till they were tender, and then beaten into a sort of paste with a little butter added now and then while the meat was being beaten.

Similar methods were used to pot game, poultry, and fish. For example a hare could be boned and the flesh minced very small with a pound of fat bacon. This

A farmhouse kitchen. The smoke billowing out of the fire-place is what "cured" the hams.

was beaten together in a mortar and seasoned with pepper, salt, cloves and mace plus an ounce of saltpetre. When well mixed it was allowed to stand for 24 hrs., baked for 3 hrs. in a glazed earthenware pot, removed and separated from the gravy. Then it was put back again into the pot and covered with clarified butter. Of course hares were better if caught earlier in the year. In April the does were breeding and could not be used.

Potted trout

Trout were potted whole, though no reason is given. When caught the fish were scaled, cleaned and washed in vinegar. They were slit down the back. Pepper and salt was put in the incision and outside, and the fish laid upon a dish for 3 hrs. Some purists took out the backbone altogether. Next they were placed in a glazed earthen pan with pieces of butter upon them and put in an oven for 2 hrs. if 14 in. long, or less in proportion. Paper was carefully tied over the pan. When done all the liquor was drained off and the fish put in a pot to cool, being covered with clarified butter when absolutely cold.

Partridges and pigeons

Partridges or pigeons were "embalmed." As soon as they were killed and plucked the birds were bled, then dried inside and out with warm cloths. All that was then necessary was to put them in earthen pans and cover them with melted butter. In this state they would keep for several weeks. This was a Suffolk lady's method, and she vouched for it keeping the birds fresh for a month.

Another method was to take all the flesh off the bones, see that it was perfectly clean, season it with pepper, salt and a little grated mace and nutmeg, and boil in equal quantities of vinegar and water to which cloves or other spice, at choice, was added. One or two bay leaves gave a pleasing flavour. When tender enough the housewife would let the whole cool off, put the cold flesh in a large gally-pot and pour the liquor upon it. The whole was covered close with leather. This is the only recipe which calls for anything besides a "fat" closure to the top of the pot, and it is rather doubtful whether a completely airtight closure could be made with a leather cover tied on by hand. It had to serve because there was no other way of doing it.

Meat, fish and poultry preserved in this way were of the greatest use to the old-time housewife. Bradley says they were always ready for the table. What he does not say is that they must have made a pleasant change from rather insufficiently salted or powdered meat, or from meat "cured" by being hung in the chimney, or only on hooks in the smoky kitchen itself. The pleasure of enjoying the product must have been some part of the housewife's reward for the tedious work of preparation; for the rest she flourished when her family was well fed. She was the forerunner of the modern food manufacturer.

Caviare for World Markets

RUSSIA DEVELOPS HER FISH INDUSTRIES

THE fishing industries of the Soviet Union, both maritime and inland, have been developed on a large scale in recent years. The best known of Russian fish products on the world's markets are probably crab and salmon conserves and caviare.

Foremost among the first-named are the giant crabs of the Far East, from the sea-coasts of Kamschatka, from which are prepared the fine-flavoured and highly nutritious crab conserves. These are particularly rich in protein, which comprises 17 to 18% of the total weight of the edible part of the crab. They also have a high content of minerals—salts of iodine, iron, magnesium, phosphorus and other elements. The conserves are produced in floating factory ships, of which illustrated descriptions have recently been published, *e.g.* in the March (1955) issue of the Soviet foreign trade journal *Vnesh. Torgovaya*, and elsewhere.

The two best known crab conserves are those sold under the brands: Chatka (Fensi) and AKO or A. The former is noted for excellent flavour and attractive appearance. Both brands are largely used in the preparation of salads and similar dishes. In the technique of processing and packing the Soviet industry claims to equal the best practice of other countries, including enamel and parchment packing to conserve the rich and valuable mineral constituents from the harmful effects of natural light. Appearance, colour, flavour and food value are well retained over long periods of storage. The pack is in cans of 198 g. capacity, or 7 oz. net, dry (without liquor and parchment). These are put into cartons, preferably 5 doz. tins, or sometimes in wooden boxes of 4 or 8 doz. Export is steadily growing, to keep pace with increasing demand in foreign markets.

Canned salmon

Salmon is found in abundance in the Pacific Ocean bordering the far eastern shores of the Soviet Union, and enter the coastal waters and rivers for the spawning period. For the tinned salmon trade there are four principal types: red salmon, "kizhuch" (silver or medium red), *salmo gibbosus* or rose coloured humped salmon, and keta or Siberian salmon. Their high food value is well known: the flesh of the red salmon contains 9% fat and 18·5% protein, while the others have slightly less fat. In the U.S.S.R. attention is mainly directed to the production of the so-called natural pack without addition of flavouring of any kind except salt.

The processing season is very short since the period of mass migration and therefore of catch

only lasts a few weeks or even days in a year. It was necessary to solve two main problems: firstly to achieve a high level of mechanisation and productivity of processing equipment, and secondly to ensure such regular supplies of fish that they will be absolutely fresh. Both problems are said to have been satisfactorily solved, including what are described as large "fish-pumping" installations ensuring continuous fresh supplies of material to the canneries. The canneries are highly mechanised with such devices as automatic scales, modern vacuum machinery and sterilising plant. Strict chemical and bacteriological control is imposed.

The best known brand from the far-eastern factories is Sokra which has a reputation dating back for a quarter-century or more. This is packed in tins of 227 g. capacity net, of guaranteed minimum 220 g., and of 453 g. net, of guaranteed minimum 440 g. The latter are either high or flat tins; the high for the smaller fish and the flat for the larger—as a general rule. They are usually packed in wooden cases for 4 doz. or cartons for 3 doz. of the larger tins; and 5 or 8 doz. of the smaller.

The foregoing are only a few of the Soviet canned fish specialities. Altogether there are more than 150 different brands.

Caviare

The remarkable properties of this Russian delicacy are well known. With its high lecithin and vitamin content, it is often recommended for special diets, *e.g.* in treatment of the central nervous system. The centre of this industry, established in the remote past, is one of the world's richest fishing grounds, namely the Volga delta and the shallow waters of the northern Caspian, into which flow also the Ural, the Kura, the Terek and other rivers. When the ice breaks innumerable shoals of roach, trout, sturgeon, etc., rush up the rivers. The caviare (roe or eggs) of the sturgeon, especially *Acipenser güldenstädtii*, has been prized for many years as a delicacy and dietetic speciality the world over. Eighty years ago some 15,000 men were engaged in the fisheries of the lower Volga and delta, and on the waters of the northern Caspian 3,000 fishing boats and 50,000 persons were employed. Far-reaching developments are claimed to have been made under Soviet rule.

Special attention has been given to the development of the caviare branch of the business, based mainly on different varieties of sturgeon (Russian *beluga, osetr, sevryuga*). The so-called granular caviare is of a dry friable consistency, each "grain" or egg easily separated from the others. The colour is light red or salmon to very dark (gray or nearly black). From 3·5 to 5% salt is added. Caviare of low salt content has the mark "malosol" (little salt). With some brands the salt content may be up to 10%. Larger packs are in small oaken barrels or 50 litre tubs.

Pressed caviare differs from the open granular form in having a softer and more compact consistency, but has the same attractive flavour and unique aroma. Connoisseurs often prefer the pressed form, packed in oaken tubs or the like of 20, 30, and 50 litres capacity. For storage and transport some refrigeration is essential, at least down to −2 or −3°C. This at first somewhat limited the market, so that a pasteurised form is now marketed in glass containers of 28, 56 or 112 g. hermetically sealed in vacuum machines. This brand has achieved wide popularity both at home and abroad. Production and sales increase from year to year.

A "granular caviare" is also made from salmon roes, especially from the *keta* or Siberian salmon. It has secured equal popularity with the other types. According to Soviet standards the salt content should not exceed 5%. Packs are in strong cases of 25, 50 and 100 kg. Other types of caviare now produced in the Soviet Union include those from fresh-water fish such as pike, carp, roach, bream, etc.

Exports go to more than 30 countries.

TEXTURE IN FRUIT AND VEGETABLES

(*Concluded from page 402*)

are favourable for the production of the precursor of lignin (either by hydrolysis of a glycoside precursor or by synthesis from more fundamental intermediates) and that this polymerises and locks the cell wall structure in such a position that it cannot imbibe water to give back the original shape of the cell. A somewhat similar suggestion may well explain why runner beans which are allowed to wilt, or dry partially, become tougher.

Biogenesis of lignen

It is clearly of fundamental importance that more should be known about the biogenesis of lignin and lignin-like materials, so that an attempt can be made to interfere with the process of lignification which spoils the quality of a number of vegetables and may insidiously (because of the smaller amounts present) affect many others. This interference could conceivably take many forms, such as cultivation and harvesting under conditions which avoid lignification, suitable manurial treatments, and even dosing the host plant with appropriate chemicals to block lignin synthesis.

The work described in this paper was carried out as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research.—Crown Copyright Reserved.

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Advances in Food Technology

CANNED FRUITS

Sucrose Inversion

Tests on canned fruits in syrup showed that the weight of the fruits at the time of opening varied a good deal according to the length of time after canning. This is due to sucrose inversion which takes place not only during the preheating and sterilisation processes but also during storage, even if the *p*H value is comparatively high, as for example with pears. Thus an analysis of the fruits after opening is not a reliable indication of the conditions prevailing at the time of canning.—Ch. Lagneau, *La Revue de la Conserve de France et de l'Union Française*, 1955, **10**, 117.

SAUSAGES

Determining the Quality of Minced Meat

The quality of the minced meat used in certain sausages depends on its capacity for water absorption and the extent to which it can retain the absorbed water. Since it is important to pre-determine the optimum volume of water which can be added, the water absorbing and binding properties of meat have been examined by the Grau-Hamm method as well as by a direct method (swelling and centrifugal separation). The swelling ability of the thigh muscles of various cattle, the volume of retained water and *p*H at various periods of storage have been established. Sausages were prepared from the meats and their quality examined in respect of the correlation of the above variables. A not very close correlation could be found between swelling ability, retained water and the *p*H. The correlation between the quality of the sausages and the retained water could be reliably evaluated but no regular correlations could be found between the quality of the sausage, swelling ability and the *p*H.—L. Kormendy and Gy. Gantner, *Elelmezesi Ipar*, 1954, **8**, 172.

TOMATOES

Mechanical Peeler

A new method for the mechanical peeling of tomatoes and other vegetables is claimed to reduce labour needs by about 60%, minimise rejects and improve hygiene.

After washing the tomatoes are immersed in brine at −10°C., to freeze the skins. An elevator carries them to a heater where they are thawed in 7-10 min. by water, at 40°C. The fruit is carried forward by screw conveyor and an overflow system eliminates the excess water together with any skins which come off at this stage.

A pump circulates and agitates water, recycling it through the hollow shaft of the screw conveyor; heating takes place by steam injection. Before passing to the peeler, tomatoes fall, from a height of about 500 mm., on a smooth surface in order to break the skins and facilitate their removal.

The peeler consists of a revolving cylindrical cage of round wire, immersed in cold water up to a certain level. The tomatoes fall into the cage and for 60 sec. are subjected to the action of high-pressure cold-water jets. This removes the skins which are successively eliminated through the overflow. The skinned tomatoes are collected by a roller conveyor which serves as a picking and finishing table.

The method is said to be applicable to cherries, apricots, peaches, grapes, plums, pears, apples, olives, lentils, potatoes, carrots, turnips, etc.—D. Cagnoni, *La Ricerca Scientifica*, May, 1955.

CANNED MEAT

"Rotoclav" Sterilisation

During the past six years the German Federal Meat Research Institute has carried out tests to ascertain whether the well-known principle of sterilisation in rotating devices could be safely applied to canned meat. After pilot tests at the laboratory, a specially developed machine was installed at a meat products factory and used under strictly controlled conditions. It was found that by applying the principle of rotation, the sterilisation time could be reduced by 35 to 75%. This time reduction, in turn, has greatly improved the appearance and taste of the meat product concerned. Spices previously lost during the sterilisation process can now be retained. All the canned meat products thus treated were found to be immune even against artificial infection.—H. Rievel and H. Reuter, *Die Fleischwirtschaft*, 1955, **7**, 169.

RICINODENDRON FRUIT

Food Value of Kernels

A mixed French and Portuguese research team has investigated the food possibilities of the fruit of *Ricinodendron rautanenii*, a tree growing in the area south of Angola and locally known as "manketti." The kernel contains 50% oil which has an agreeable taste. The residual cake is rich in protein and minerals but poor in vitamin B. The protein has a food value similar to that of groundnut protein; its quality can probably be improved by heat treatment. Though not toxic, the skin of the seeds is hard and indigestible and would have to be removed. Tests so far indicate that manketti fruit may become a useful food.—J. Adrian, A. Rerat, J. Xabrecas, *Oléagineux*, 1955, **10**, 481.

FRUIT PRODUCTS

Hip Syrups

Ripe, hard hips are crushed between wooden rollers and mixed with an aqueous 0·1% citric acid solution. Pectinase is added and the mixture is left to stand at 38°C. for 6 to 12 hr. and finally pressed in a baling press. The resulting juice is concentrated at a vacuum of 70 mm. Hg. at 38 to 40°C. The ascorbic acid content of the concentrated product is about 10,000 mg./kg. The product may be mixed with raspberry or orange syrup in a ratio of 1:3 to take away the sour taste. About 20 ml. of the mixture covers the daily vitamin C requirements of 1 person.—A. Inczedy and E. Demel. *Elelmezesi Ipar*, 1954, **8**, 182.

CANNED PURÉES

Non-enzymatic Discoloration

Studies on the non-enzymatic browning of foods have shown that CO_2 and oxygen are involved in these reactions. In an attempt to clarify further the relationship between the composition of head-space gas and change in colour, the concentration of these gases in the head-space of sealed tubes of fruit and vegetable purée was determined periodically. Reflectometric measurements of the colour in the purées were made at the same time. Oxygen was absorbed and CO_2 evolved by all the food studied. There was a significant correlation between oxygen absorption and discoloration in all foods except pears. The correlation between CO_2 evolution and discoloration was significant only for beets, carrots, green beans and squash. Significant correlation between oxygen absorption and CO_2 evolution was observed for all except spinach purée. The development of non-enzymatic discoloration in the vegetables closely paralleled absorption of oxygen, indicating that inhibition of darkening in these puréed foods may be assisted by maintenance of low oxygen levels.—J. J. Vilece, I. S. Fagerson and W. B. Esselen, *Ag. and Food Chem.*, 1955, **3**, 5, 433.

YEASTS

Fat-producing Organisms

The most widely used yeast-producing organism is *Candida utilis* but although it is preferred to other yeasts on a number of grounds, most of them are contestable. The outstanding advantage of *C. utilis* over *Saccharomyces cerevisiae* is its ability to assimilate other than hexose sugars. The superiority of its vitamin B content and its protein content is doubtful.

The next most used organism is *Candida arborea* which has the advantage of tolerating temperatures of up to 40°C. without appreciable loss of yield and is said to be more tolerant of changes in *p*H and salt concentration and to give a whiter product.

Oidium lactis has also been used for making food yeast but not on a scale comparable to the others. When the available carbohydrate consists essentially of hexose sugars it seems reasonable that the industrial species *Saccharomyces cerevisiae* should be used. The surplus brewer's yeast available in this country is practically all taken up for feeding and for making yeast extract. The most obvious source of extra yeast seems to be baker's yeast of which about 50,000 tons are produced annually.

Some yeasts can produce appreciable quantities of fat in their cell metabolism. This is essentially a two-stage operation, the first ensuring maximum growth by adequate nitrogen content in the medium. In the second, the nitrogen is drastically decreased which results in the accumulation of fat. The most promising fat-producing yeasts seem to be *Rhodoturula gracilis* and Starkey's 72 and 74. The former has been suggested as a food adjunct just as it is and without extraction of the fat. More research on its actual handling is necessary.

The Starkey organisms seem promising and worth further study, though the present economic situation in the U.S. does not encourage work on fat-producing yeasts.—H. J. Bunker, *J. Appl. Bact.*, 1955, **18**, 1.

BAKED GOODS

Flour Fineness and Quality

The Federal Research Institute for Wheat Processing, Detmold, has carried out baking tests with flours of the same quality but different degrees of fineness to determine the flour particle size most suitable for certain bakery products. Fine flour is best for rusks and yeast cakes but for puff pastry coarser flour is to be preferred for external appearance, although not necessarily for flavour. In certain other cases, blends of fine and coarse flours give the best results.—H. Dörner and E. Tehsmer, *Gordian*, 1955, **55**, 1307; 22.

MARGARINE

Continuous Production

For some time American margarine factories have used continuously operating hermetically sealed machines for solidifying margarine emulsion. In Europe, this method cannot be applied in quite the same way because the raw materials used have different melting points. A German company has now developed a new set of machinery, known as "Kombinator," which permits the continuous production of margarine, even if made from heterogeneous raw materials, under the best possible conditions.—R. Knollenberg, *Fette, Seifen, Anstrichmittel*, 1955, **57**, 449.

BREAD

Waxed Paper Aids Vitamin Retention

Opaque waxed paper is about twice as effective in reducing the degradation by light of riboflavin in enriched white bread as is cellulose film.

In the laboratory studies, enriched white bread wrapped in opaque waxed paper retained 30 to 60% more riboflavin than that wrapped in cellulose film after maximum probable exposure to diffuse daylight and/or fluorescent light under normal conditions of commercial distribution.—W. L. Hardy and W. H. Kanninen. Paper read at 15th annual meeting, Inst. of Food Technologists.

Machinery and Equipment

New valve positioner

A valve positioner fitted with a new diaphragm type pilot and claimed to give improved response and higher capacity, is among additions to the *Nullmatic* range of instruments made by Sunvic Controls Ltd. The company say that the capacity of the positioner has been increased over three times while the air consumption in a balance position is reduced to one-third. Other new features of the positioner are that the diaphragms are built to withstand severe vibration and the range-spring pivot has been designed to eliminate hysteresis. For difficult applications, the 1% nominal throttling range is easily changed to 5% or 10%.

Rough-wash units for abattoirs

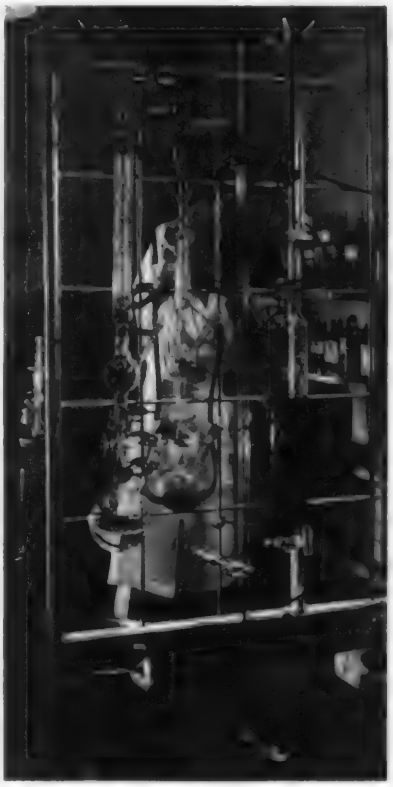
Since the end of meat rationing and the relinquishment by the Government of control over abattoirs a number of privately owned abattoirs have been set up throughout the country in addition to the municipal establishments. Many of these private abattoirs are attached to large meat concerns which, like the municipal abattoirs, arrange to sell the heads, feet, tripe, and other "by-products" of the slaughtered animals to dealers.

Drum washers are used in some of these abattoirs when thorough machine-cleaning of these products is required, but for smaller establishments and dealers who need only to rough wash the heads and tripe Industrial Waste Eliminators Ltd. are producing a head washing cabinet and tripe washing chamber which take up little space.

Both the head washing cabinet and tripe washing chamber are simply designed but meet all the requirements necessary for rough washing. They are made of mild steel plate welded to an angle frame with half round beading on the exposed edges and are galvanised after manufacture. Dished bottoms with outlet to a drain are provided for the washing-down water which is applied by hose. The head cabinet, which has a floor space of only 3 ft. 10 in. × 2 ft. 10 in. and an overall height of 5 ft. 6 in. has a bar with two sliding hooks. The three-sided construction allows a strong jet of water to be used without excessive splashing.

The tripe chamber is made to suit existing hanging rails along which the paunches pass through the chamber, generally on skid hooks. The dimensions of the chamber are: floor space 3 ft. × 1 ft. 10 in., overall height 7 ft. 6 in.

A receiver-indicator designed by Foxboro-Yoxall.



Climbing film evaporator.

Climbing film evaporator

An all-glass climbing film evaporator made by Quickfit and Quartz is claimed to be capable of evaporating aqueous feed stock at the rate of 3 litres/hr. when under vacuum so that water boils at approximately 40° C. Typical uses of the evaporator are the concentration of fruit juice and milk protein solution at the laboratory stage—with single pass working, concentration to 25-50% is normal. The apparatus incorporates a new, highly efficient coil condenser of over 2 sq. ft. surface area. The receivers, which allow for continuous take-off without disturbing the vacuum on the apparatus, are made of strong, interchangeable components.

Pressure recorder

A new pressure recorder for water, steam, oil, air, gas or other fluids is announced by George Kent Ltd. Known as the *Commander KP*, the instrument is said to provide a clear and accurate record on a B.S. 11-in. diameter chart, and to be suitable for wall, panel or post mounting. The pressure measuring elements are Bourdon tubes which give a large number of ranges from 15 to 3,500 p.s.i. (maximum values) and vacuum down to 30-in. mercury. Interchangeable unit construction enables the user to assemble a considerable variety of instruments from standard units.

New receiver indicator

A receiver-indicator has been added by Foxboro-Yoxall Ltd. to their well-known range of *Consotrol* recorders, controllers and indicators. The new instrument is designed for use in those applications where a permanent record is not required. It occupies a panel space of only 6 in. × 6 in. and has a clearly marked scale on its face which takes the place of the chart and chart mechanism used in the M/53 recorder with which in all other respects it is identical. In fact the indicator can be easily converted into a recorder should the need arise.

The receiver-indicator is available in a number of models coded as M/5301 to M/5304 which between them provide actions covering a wide range of applications. The simplest has a single pointer to indicate the measurement of one variable. From there, pointers may be added to provide indication of two measured variables, indication of the valve position and indication of the

set point. A transmitter for the manually operated set point may also be included which will remotely position the control point of a M 58 or M/59 controller. A switch may be incorporated to provide for remote manual operation of the control valve by permitting withdrawal of the controller without disturbing the piping. Further combinations may include the *Pneumaticset* or Ratio Sub-panels. The *Pneumaticset*, for Cascade type indicating-controlling systems, uses the 3-15 p.s.i. output signal of a primary pneumatic controller to position the set point of a secondary controller. The set point may also be positioned manually from the sub-panel. The Ratio Sub-panel with manually adjustable ratio setting is used when it is required to maintain the set point of a secondary controller in a given ratio to the primary variable.

"Floating" factory stools

Stools which "float," revolve, rise and fall to follow their user's movements have been developed by S. and B. Poultney Ltd., and installed in the bottling department of a Manchester brewery. The makers say that if necessary the stool can be swivelled out of the user's way or completely removed from its floor socket for floor cleaning purposes.

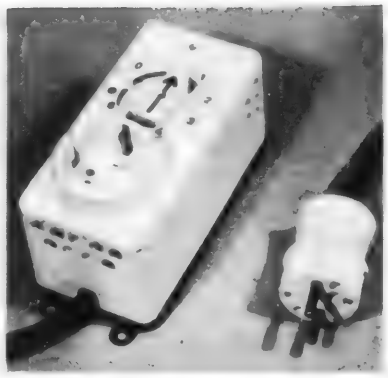
The frame follows the "floating" principle invented by Poultneys but the central column terminates in a box section member of sufficient strength to support more than normal weight and leverage. At the opposite end of the box member is a heavy section rod which fits snugly into a tube cemented in the floor, and in which it swivels. The seat is filled with rubberised fibre and covered with *Dulon*. The price is 70s. 6d. carriage paid.

Pumps for dry materials

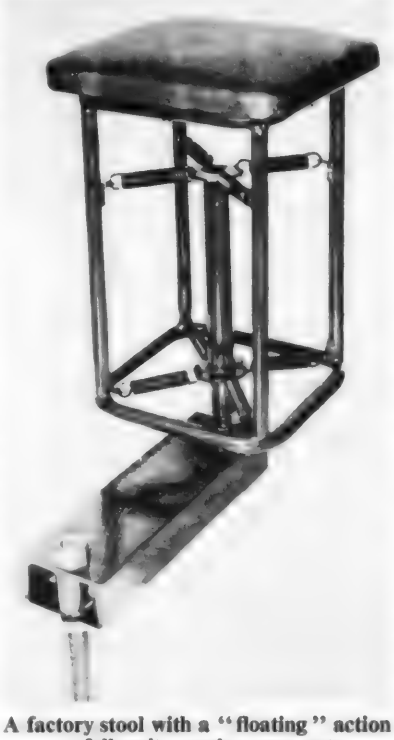
The "DM" type Mono pump for handling dry materials has now graduated from the development stage and is now available in two sizes capable of dealing with loose dry powders without clogging, compacting or fusing. The DM 12 unit has an output of up to 250 cu. ft./hr. when running at a speed up to 300 r.p.m. Horse-powers of only 2 to 5 are required, depending on the physical characteristics of the powder, the degree of fluidisation and on the nature of the piping system. The DM 10 size is available for outputs up to 100 cu. ft./hr. using running speeds up to 250 r.p.m.

Fluidisation of the powder is necessary to reduce friction in the pipeline. For this purpose the use of air is kept within very low limits. Existing information relating to the pumping of powder is very scanty, but the research department of Mono Pumps Ltd. has now collected considerable data relating to the movement of various powders through enclosed pipeline systems.

Applications covering the conveyance of cereals or the product of cereals for human or animal consumption are under joint development with Henry Simon Ltd., who have the sole marketing rights for the DM type Mono Pump for this class of work. Applications involving the handling of any other dry material can be considered by Mono Pumps on the basis of physical examination and tests, so that the reaction of the material to pumping can be assessed.



The continuous and loss-free regulation of electric heating apparatus is said to be provided by this "Electrotap" controller unit.



A factory stool with a "floating" action to follow its user's movements.

"Cross-licensed" water cooler production

Water coolers designed by the Marley Co. of Kansas, U.S.A., are to be made by Heenan and Froude Ltd., under an agreement between the two companies. The British company will be exclusive licensees and will manufacture the coolers for practically all countries outside North and South America. The design will be slightly modified for British requirements. The Heenan "P" type forced-draught cooler will continue to be made where it is the most suitable type for the duty and the Marley Co. holds a "cross licence" to build Heenan coolers.

The first models to be marketed by Heenan and Froude will be the single-flow *Aquatowers* which will be followed by larger types. The *Aquatower* range of 11 sizes covers low temperature cooling (refrigeration plants, air compressors, etc.) from 200 to 4,800 gal. per hr. and high temperature cooling (diesel generator sets, etc.) from 600 to 13,500 gal. per hr.

The single-flow *Aquatower*, which operates on the induced draught cross-flow principle, is designed to reduce running costs for users of many different types of equipment. Among the advantages of these coolers are their low fan power resulting in reduced electricity costs and their low height which means they are particularly easy to install in confined spaces.

Power controller for electric heaters

The power consumption of electrical heating apparatus in a range from 0 to about 60% of its full load can be continuously regulated by the *Electrotap*, according to its makers the Stabilag Co. Ltd.

The unit, which operates on the energy regulator principle, is inserted in series between the mains and the apparatus and can be suspended at any place in the vicinity of an existing wall socket, saving the expense of a special wiring installation.

The unit is claimed to compensate for fluctuations in the electrical supply and possibly harmful changes in the heating input which could reduce the quality of the material being heated. In many cases it replaces automatic temperature control.

The pilot unit, housed in a white plastic case, consists of a heated bimetal strip mounted with three screws on a base plate. A control knob actuates the pilot switching unit causing the bimetal strip to change its position relative to the tripping point of the leaf spring, enabling a continuous regulation of the switching cycle. In this way, it is claimed, continuous regulation of the heating apparatus is achieved.

Man-riding floor scrubber

A man-riding scrubbing and drying machine—said to be the first to be produced in this country—has been introduced by the Cowlard Floor Maintenance Machine Division of Matling Ltd.

Designated the *Saturn II*, this machine scrubs away the dirt and then lifts it from the surface of the floor.

Battery-powered and therefore free from the danger of trailing cables, and the need for power points, the new machine enables floors to be scrubbed clean and dried in one operation without impeding production.

The operator sits astride the machine with all the controls to hand. Clutch and brake levers are mounted on the steering handle-bars. Hydraulic valves control the pressure exerted when the brushes are in use, and facilitate brush changing.

The brushes are arranged in the shape of a four-pointed star with a cut-out centre. They inter-mesh like gears so as to ensure that no unscrubbed streaks are left on the floor, while the cut-out centre facilitates cleaning. Interchangeable brush fillings are available, which can be changed by using the hydraulic jacks flanking the traction unit to raise the machine.

The detergent and water mixture is gravity fed through a sprinkler system immediately ahead of the rotating brushes. As the machine passes over the scrubbed area of the floor, the dirty water is piled up by trailing squeegee rubbers attached to the suction bar at the rear and sucked up vertically into the sludge receiving tank. This suction system is said to be so effective that the clean floor is dry within seconds of the machine's passing.

U.S. packaging machinery to be made in Britain

Mather and Platt Ltd. have come to an arrangement with the American packaging machinery manufacturers, Standard-Knapp Division of Emhart Manufacturing Co., to manufacture their range of packaging equipment in this country.

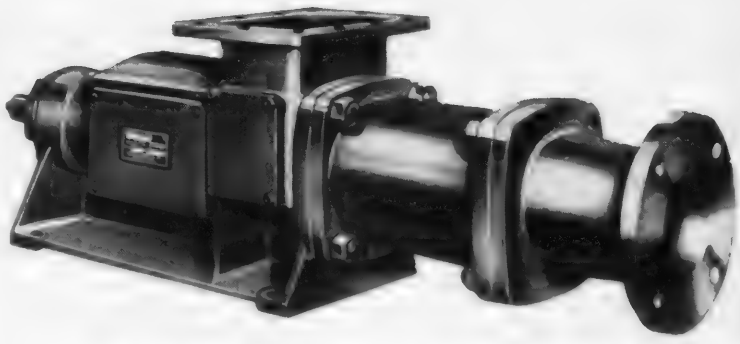
Under this arrangement Mather and Platt Ltd. will be able to sell the British-made machinery in Great Britain as well as for export.

The association between the two companies started some years ago in France when S.A. Mather and Platt took on the representation of the Standard-Knapp equipment in several European countries.

This new development will take place at Mather and Platt's Radcliffe factory. Until the beginning of the year this factory had been rented from the Ministry of Supply, but it has now been purchased and plans are already being made to expand production there. The packaging machinery business will accordingly be developed by the food machinery department which is already housed at Radcliffe and makes a wide range of equipment for canning and quick-freezing.

Among the machines to be manufactured are crate dumpers and unscramblers, boosters, labellers, case packers, gluers and sealers. The wide range of goods which can be handled by this high-speed automatic machinery includes cans, bottles, glass jars, and regular-shaped packets or cartons for such things as margarine, sugar, breakfast cereals, or electric light bulbs.

It is hoped that production will start this Autumn on machines judged most suitable for the British market.



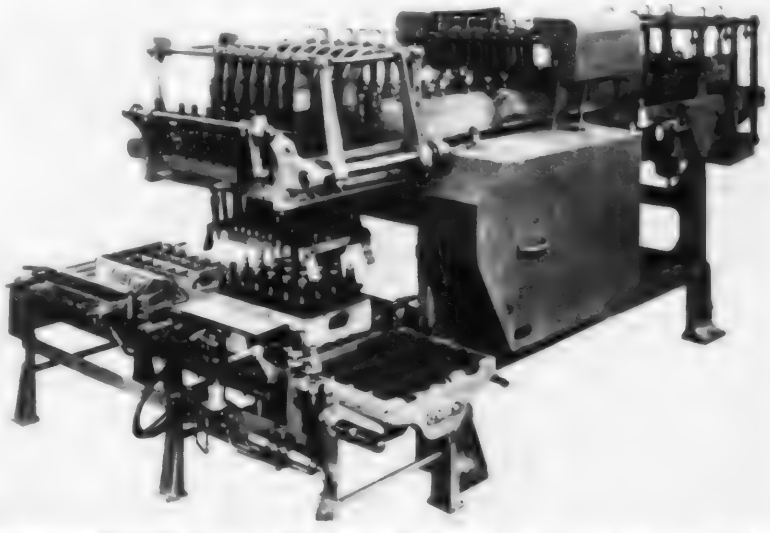
This new pump for dry materials is available in two sizes

Removing condensate from evaporators

In the food industry there are many kinds of "evaporator," ranging between the pan with a steam jacket and the latest design of climbing film evaporator. The various characteristics and operating conditions call for a variety of steam trapping and air venting installations, for the efficiency of any particular evaporator is to a large extent governed by the efficiency with which condensate and air are discharged from the unit.

There is often difficulty in clearing condensate from units working on low steam pressures, where the discharge has to be raised to a higher level return. An example is a calandria with a high rate of condensation, possibly over 10,000 lb. of steam per hr., at a pressure of perhaps 5 or 10 p.s.i.

In such a case, state Spirax-Sarco Ltd., in *Food Topics*, the most effective arrangement is to drain the condensate by gravity to a simple automatic pump of the *Ogden* type. Quick clearance of the condensate at the rate required by the evaporator is assured, and the automatic pump is capable of lifting the water to a considerable height irrespective of the low steam pressure in the evaporator.



Standard-Knapp model 830 6-lane bottle packer with L.H. model 830-CT case feed, showing filled case on table in lowered position under stripping device.

News Digest

Tea supply enquiry

The supply of tea is to be investigated by the Monopolies and Restrictive Practices Commission. Announcing the enquiry, the Board of Trade said that it will cover "the facts of the matter and their bearing on the public interest."

The intention of the President of the Board of Trade to refer tea to the commission was announced in Parliament last June. Spokesmen of the trade said that they welcome any enquiry and feel sure that tea prices will be shown to be the result of "the normal working of supply against demand."

Fewer welfare foods wanted

Lower consumption of welfare foods —National dried milk, cod liver oil, vitamin tablets and orange juice—has been reported for the last six months of 1954 when their distribution was undertaken by local health authorities.

The Minister of Health has asked these authorities for information which will help him to establish the reasons for the decline.

Food technology courses

Details of a two-year diploma course in General Food Technology are announced in the prospectus of National courses published by the National College of Food Technology, Cranwood Street, London, E.C.1. The course is offered to those who are directly concerned with the control of food processing operations and to non-graduate laboratory personnel engaged in the food industry. It is also suitable for those who wish to undergo training before entering the industry and is primarily intended for potential production managers or factory managers. The college also offers national courses of postgraduate study in general food technology, food microbiology and food quality control and offers facilities for research in the fields of food science and technology to suitable science graduates.

The college also conducts regional courses at Eagle Court, St. John's Lane, London, E.C.1 which provide technical training in the meat, fish, fruit, vegetable and milk trades.

A diploma course in chocolate and sugar confectionery and training for the Higher National Diploma in bakery (including cereal technology) are announced by the Department of chemistry and food technology of the Borough Polytechnic. Both courses last two years. The course in chocolate and sugar confectionery is designed for those who wish to prepare for positions in family concerns or to seek employment with larger firms and for trainees who are seconded to the course by their firms. The course in bakery is designed for students wishing to prepare for technological and executive posts in the bakery and other cereal and allied industries.

The Polytechnic is also holding two special courses in food microbiology, each consisting of lectures and laboratory work extending over 20 weeks. The first, an introductory course, covers the yeasts, the moulds, bacteria, industrial fermentation, microbiology and public health, etc. The second is an advanced course and deals with the development of food microbiology, food hygiene, food spoilage and special applications of microbiology as in the brewing industries, milk and dairy products, etc.

What to see at the Dairy Show

The 69th Dairy Show, to be held at Olympia, London, from October 25 to 28, is likely to be visited by many readers. An illustrated preview of some of the exhibits is to be published a few days before the Show begins in the November issue of our associated journal *Dairy Engineering*; the issue will also contain alphabetical lists of the exhibitors in the Grand Hall, National Hall and Galleries. Copies can be obtained by writing to the Circulation Department, 9, Eden Street, London, N.W.1.

Five years of youth for industry

An increased supply of young people will be available to industry in two years' time, said the Minister of Labour, Sir Walter Monckton, recently. However, he warned, this will only last for five years—from 1957 to 1962.

Sir Walter, who was making a statement on the work of the Youth Employment Service to the National Joint Advisory Council, said that industry may not yet realise that it will have, for these five years, an opportunity which will not return to pick out and train the supply of skilled men for its future needs.

British branch of American bakery engineers

A British Chapter of the American Society of Bakery Engineers has been formed. The present address of the Chapter is Room 512, Stafford House, Norfolk Street, London, W.C.2.

Glass splinters in milk

Broken glass is often found in bottles of milk distributed to schools, according to a report published by Mr. S. Hallard, chief inspector of weights and measures to Cheshire County Council. Giving the results on an investigation into cases where glass had been found in bottles of school milk, the report says that the amount of glass found ranged from a teaspoonful down to minute splinters so small that they were sucked up by children through drinking straws. In most cases the rim of the bottle was chipped so that it was impossible to prove that the glass was in the milk when it left the dairy.

New company to manage Government cold stores

A company—National Cold Stores (Management) Ltd.—has been formed by the cold storage industry to undertake on an agency basis, as from August 27, the management of the 47 cold stores built by the Government during the war which have a total capacity of 15 million cu. ft.

The stores will remain the property of the Government. They are at present managed for the Government by designated cold storage firms. Similar arrangements will apply under the operation of the managing company. The company, in addition to maintaining the stores ready for use in case of an emergency, will also use them for Government storage and commercially, as required.

The following Directors have so far been appointed to the Board:

Chairman

Mr. H. E. Davis, Director of Milk Products (New Zealand) Ltd., and of The National Bank of New Zealand.

Directors representing the cold storage industry

Mr. H. G. Jaeger of Chambers Wharf and Cold Stores, Ltd.

Mr. K. Lightfoot, O.B.E., of The Lightfoot Refrigeration Co., Ltd.

Mr. J. E. G. Ruddin, C.B.E., of The Central Cold Storage Co.

Mr. G. E. Tonge of Hays Wharf, Ltd.

Directors appointed by the Minister of Agriculture, Fisheries and Food

Mr. J. W. Pugsley, Principal Executive Officer, Ministry of Agriculture, Fisheries and Food.

Mr. G. D. Wilson, C.B.E., Chartered Accountant in practice, lately Finance Controller, Ministry of Food.

Food on commercial TV

Food manufacturers among the firms who had booked time on the first day of commercial television included Batchelor's Peas Ltd. and Crosse and Blackwell Ltd. Batchelors, who began planning as soon as a rival television service to the B.B.C. was proposed, featured a film demonstrating Batchelor's soup mixes. Three days later the first Batchelor programme for peas was televised. Their campaign consists of five films demonstrating soup mixes and a series featuring peas in which the Gaunt Brothers write and sing a special song each week entitled "Batchelor's Wonderful Peas," which includes references to topical news items.

Crosse and Blackwell showed a film of their famous "Ten O'Clock Test" panel in action as it is every morning at 10 a.m. when the firm's products are tasted.

New pork product

Chopped cured pork has been added by C. and T. Harris Ltd. to their range of canned meats. The product, which is based on a very high content of selected porkmeat, is intended for packed lunches, picnics and party snacks.

The pork is being presented in 12-oz. key-opening rectangular cans, labelled in "Stratford" red. Harris are restyling all their labels in this colour.

Cold store van for meat pies

A new type of refrigerated van, believed to be the first of its kind in Britain, has recently been put into operation by the Excel Company Ltd. It is being used for deliveries of meat products to retailers in the areas between Leighton Buzzard and Welwyn Garden City, Letchworth and Hemel Hempstead.

The purpose of the van is to keep sausages and pies fresh from the time that they leave the factory until the retailer can put them in his own refrigerator.

The van was designed by Mr. L. J. Saunders, Excel's transport manager, who has previously worked with Nuffields and the Ministry of Supply. It is a Seddon 25 cwt. with a Perkins P.3 Diesel motor.

Wingett-Dole plate refrigeration units, situated on the walls and roof of the van interior, control the temperature of the interior at 30°F. and insulation is effected by 2 in. thick onozoto. The refrigerator's compressor is housed in the cab alongside the driver. There is a single rear door entry. Duralumin racks on either side of the central gangway are designed for easy cleaning.

The van will hold almost 2,500 lb. of assorted stock—enough normally for two days' deliveries in a semi-rural area.

Selecting Sausage Casings

Fifty million yards of sausage casings a year could pass through the selecting rooms of their new factory at King's Cross, London, according to the Oppenheimer Casings Co. Ltd. The company has found that consumers prefer sausages of uniform size and quality and intends to pay even more attention than before to grading and selection.

The casings are water-tested for perforations and at the same time gauged for calibre. While powerful jets of water run through the skins, their diameters are measured against a rack fitted with several sets of pegs.

Because of the nature of the work, Oppenheimers have taken care that lighting conditions and other amenities are the best possible. The factory has 8-9,000 sq. ft. of operating space, has tall windows and glass roofs. The building is topped by a wide flat roof, which the company plans to convert into a recreation roof garden.

The new factory is situated less than a mile from the Smithfield Central Meat Markets. A section of the main selecting room is shown in the photograph.

Quick-freezing no cure-all

Quick-freezing is no solution to periodic gluts of herring, according to Sir Frederick Bell, chairman of the Herring Industry Board. Speaking at a conference to answer criticisms that the Board has failed to provide adequate outlets, and should have quick-frozen more extensively, Sir Frederick said that freezing would never solve the problem alone. Defending the reduction of herring to oil and meal he said any method of dealing with gluts must be capable of making good use of herring which had been landed for some time. It must be economical in capital cost and in labour and the end-product must be easy to store, in good demand, and reasonably cheap to distribute to buyers. How would quick-freezing measure up to these requirements when compared with the oil and meal process? Herring for quick-freezing must be in prime condition. Herring of any kind—even stale fish—were suitable for the oil and meal process.

Less than one-third of all the herring taken for reduction to oil and meal during the last three years were of a condition suitable for quick-freezing with any reasonable hope of turning out a satisfactory and saleable product.

London "showroom" for Irish goods

Whiskey and stout, sugar confectionery and cakes, meat products, condensed milk and cheese are among the goods which are being exhibited at the newly-opened Irish Exports Centre in Regent Street, London.

The Centre is to be the London "showroom" of the Irish Export Promotion Board. Since about 90% of Irish exports are already taken by the United Kingdom, the new Centre is not designed primarily to expand Irish exports to Britain but to other countries.

COMPANY PROFITS AND PROSPECTS

Competition for Bush

Intensive competition, particularly in overseas markets was met by W. J. Bush and Co. Ltd. during 1954 according to the chairman's report However, a satisfactory increase has been made in the company's overall trading. Net profit for the year rose to £271,168 (£258,391).

*

Energen Foods sell more

Sales of Energen Foods Ltd. during the year ended March 31, 1955 increased by nearly 40% over the previous 12 months reported their chairman at the annual meeting recently. Profit before taxation was £90,606 (£73,334) of which £53,145 was absorbed by tax. A final dividend of 12½% making a total for the year of 20% was approved.

*

Brewers sell more bottled beer

The general decline in the sale of draught beer and the greater demand for the more expensive bottled beer was remarked upon by the chairman of Truman Hanbury Buxton and Co. Ltd. in his annual report. He also reported a substantial increase in the turnover of the wine and spirits departments. The trading profit of the group before providing for taxation at £1,002,435 shows a decrease of £83,088, partly due to lower output but chiefly because of increased expenditure. The company is entering on a period of very heavy expenditure on rebuilding war damaged and re-sited public houses and they will also start erecting a number of new houses. The re-equipment of the breweries and bottling stores is almost completed.

The net profit of the company for the year after providing for taxation is £300,769 (£296,308). A final dividend of 11% making 14% for the year was adopted.

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Lower dairy profits

The year's profits for Independent Dairies Ltd. fell to £208,603 (£361,626). Among the reasons for the decline given by the chairman at their annual meeting were the cessation of purchases of manufactured products by the Ministry of Food, a falling off in the demand for tinned cream and the continued control by the Ministry of Food over liquid milk profit margins.

The company's new processing and bottling plant at Harrow Road, London, is virtually completed and is expected to be in full production soon. Further increases in the group's manufacturing capacity have been or are in course of being completed at Milborne St. Andrew, Dorset, Minsterley, Shropshire and Lockerbie, Dumfriesshire.

Gin gains from Scotch

Lower profits from their Scotch whisky blending companies kept the £18,060,073 trading profit of the Distillers Co. Ltd. from being higher, reported the chairman, Sir Henry Ross, at their annual meeting recently. Whisky laid down before the war is now being exhausted and blenders are beginning to use the higher-priced post-war whiskies. However, in spite of these lower profits the net profit attributable to the group was £7,873,409 compared with £7,316,549 last year. The group's gin companies have had a very satisfactory year, particularly as the shortage of Scotch whisky has favoured the gin industry. Making a strong protest against the "extortionate duty" of 210s. 10d. per proof gal. on Scotch whisky, Sir Henry declared that "Scotch whisky is, perhaps, the best ambassador that this country possesses."

Erections and Extensions

Edward Sharp and Sons, Ltd., confectionery manufacturers of Maidstone, Kent, are planning the erection of a new warehouse, garage and stores building, with offices and canteen, on a 4½ acre site in Tovil Road, Maidstone.

*

J. Lyons and Co., Ltd., Cadby Hall, West Kensington, W.14, have had plans approved for the early erection of a stores building and the construction of an extension to their distributing depot in Horn Lane, Greenwich, S.E.10.

*

Farley's Infant Foods, Ltd., have had plans prepared to construct new extensions to their premises at Belmont Street, Eccles, Lancs.

*

A new factory is under construction on a site at Glenavy, Co. Antrim, N. Ireland, for **Ulster Farm By-Products, Ltd.**

*

A new sausage manufacturing factory is to be erected by the **Dalziel Co-operative Society, Ltd.**, Motherwell, at Albert Street and Nelson Street, Motherwell, as part of a new block, incorporating manufacturing plant and stores. Approval has been granted by the Dean of Guild Court for the scheme, which will cost £45,000.

*

Brains (Food Products), Ltd., Park Road, Bristol, are seeking permission to erect a new factory on Fishponds Trading Estate, Bristol.

A new cold store and office building are being erected on a site in Godstone Road, Whyteleafe, Caterham, Surrey, for **The National Canning Co., Ltd.**

*

Metal Containers, Ltd., are planning to construct a new £15,000 extension at their factory in Crayford, Kent.

*

British Fish Canners, Ltd., of Balm Road, Leeds, 10, are having a new canning factory erected on a site at Whitstable, Kent, at a cost of £30,000.

*

Stafford Bakeries, Ltd., are planning to construct an extension to their bakery in Wantz Road, Dagenham, Essex.

*

The Danish Bacon Co., Ltd., Weir Street, Darlington. propose building a new factory on a site in Cargo Fleet Lane, Middlesbrough.

*

British Cellophane, Ltd., 12, Conduit Street, London, W.1, are seeking permission to erect a new factory on a site at Sandscale, Barrow-in-Furness.

*

Midland Cattle Products, Ltd., are building an extension to their factory premises in Wood Road, Smethwick, Staffs.

*

T. Wall and Son, Ltd., are having an ice cream depot constructed at Shentonfield Road, Manchester.

*

Carricks, Ltd., bakers and confectioners, have had plans approved for extensions to their bakery in Ponteland Road, Newcastle-on-Tyne.

*

W. Macdonald and Sons (Biscuits), Ltd., have had plans approved by the Board of Trade for extensions to their biscuit factory at Hillington Industrial Estate, Glasgow.

*

W. J. Lowcock, Ltd., mineral water manufacturers, will shortly erect new extensions to their factory in Greta Street, Middlesbrough.

*

Permission is being sought by **Liverpool Packing Case Co., Ltd.**, 55-57, Park Road, Liverpool, 8, to have a new factory constructed on a site in Shaw Road, Speke Industrial Estate.

*

North Shields Fish Meal and Oil Co., Ltd., will shortly rebuild and modernise their factory at Tanners Bank, Tynemouth. The scheme has been approved by Tynemouth Planning Committee.

APPOINTMENTS AND RETIREMENTS

MR. W. F. SEAWARD, F.G.I., grocery and provisions buyer of the London Co-operative Society, has retired after 51 years' service. Recently Mr. Seaward has spent £20 million a year to stock 377 shops and five warehouses.

*

MR. WILLIAM DAWS, supervisor in the meat-preparation department at the Willesden factory of T. Wall and Sons (Meat Products), Ltd., has retired after 37 years' service with Wall's. Mr. Daws was presented with a television set, the presentation being made by Wall's chairman, Mr. Cecil W. Rood, in the management canteen at the Willesden factory.

*

DR. E. T. MURDOCK, M.A., B.SC., quality-control manager of T. Wall and Sons (Meat Products), Ltd., has been appointed assistant refinery manager in the London area for the British Oil and Cake Mills, Ltd. Dr. Murdock, who is 38, will be based on B.O.C.M.'s Erith, Kent, refinery.

*

MR. W. PLUMB has been appointed deputy commercial manager for the Liverpool and Netherton Works of the English Electric Company Limited. For the last six years he has been manager of the Leeds Branch Office of the company and he is succeeded there by MR. A. J. EVANS.

*

MR. EDWARD R. HILTON III has been appointed an assistant to the sales manager of the British Materials Handling Division of The Yale and Towne Manufacturing Company.

*

MR. LEWIS A. MAY was recently elected a director of Moray Firth Foods Ltd., manufacturers and packers of *Scotfrost* frozen foods.

*

DR. J. T. MCCOMBIE, B.SC., A.R.I.C., A.R.C.S., has been appointed general sales manager of the British Industrial Solvents Division of The Distillers Company Ltd.

*

MR. E. BARNARD, C.B., C.B.E., D.S.O., has retired from his position as deputy secretary in the Department of Scientific and Industrial Research which he has held since 1945.

Obituary

The death occurred on August 27 of MR. HAROLD HILLIER, O.B.E., M.I.MECH.E., M.I.MAR.E., engineering and technical director of G. and J. Weir, Ltd., Cathcart, Glasgow. Mr. Hillier, who was 64 years of age, was in control of all design work and technical development of the firm.

OBITER DICTA

● The Army still marches on its stomach, which today is half-full of corn flakes.—*Letter to Sunday Times.*

● The three pubs at Ditchingham, Norfolk, are kept by S. Wildgoose, J. Eagle and F. Raven.—*Daily Express.*

● Oyster poachers are mainly men over 40. Younger men are not so keen to get up to catch the early morning tides.—*River Bailiff of Maldon.*

● While undoubtedly ornamental, I do not think a butcher's shop is really the place for a lady.—*Speaker at Bristol Association of Meat Traders.*

● A new long-playing record—"Here's How"—gives directions on how to mix 28 different cocktails.—*New York correspondent, News Chronicle.*

● I almost caught a cardynacle by corpus bones, but (unless) I have a triacle, or elles a draughte of moyste and corny ale mine herte is lost.—*Geoffrey Chaucer.*

● I had to dose myself with stomach tablets last night and this morning because I had not discovered what the sausages were like in our tea room until I had bitten into them.—*Mrs. Mann, M.P.*

● Byron is said to have disliked to see women eating, unless lobster and champagne. Beau Brummell claimed to have broken off an affair because the lady "actually ate cabbage."—*E. S. Turner in "A History of Courting."*

● The customs which have evolved about the drinking of tea contribute to the enjoyable experience of finding oneself socially accepted by people who are quite sober. — *Official of Veterans' Administration, U.S.A.*

● There are 51 million people in this country who weigh, altogether, more than 3 million tons. Every year they eat some 25 million tons of food—but how many ever stop to think where their daily bread comes from? —*I.C.I. advertisement.*

● The British public is very phil-avian and can be counted upon to wax indignant at the thought of their favourite blue tits pecking the tinsel at the top of the bottle on the front step only to find that it contained fruit juice instead of the cream of the milk.—*Travers' Circular.*

Symposium on energy

The Nutrition Society is holding a symposium at the National Institute for Medical Research, The Ridgeway, London, N.W.7, on Saturday, October 15, 1955, on Energy Expenditure in Man. The chairman will be Professor R. C. Garry. Further particulars may be obtained from Dr. R. J. L. Allen, c/o Beecham Foods Limited, Brentford, Middlesex.

Lemon-flavoured glucose drink

A glucose drink flavoured with whole fresh lemons is being launched by O. R. Groves Ltd., makers of *Sunkap* and *Sunfresh* orange drinks.

The new product—known as *Citroze*—is a concentrated drink and has to be diluted, one part to two parts of hot or cold water or soda water. It is said to contain 30% pure glucose (dextrose mono-hydrate) and when diluted contains 10% weight for volume of pure glucose. It will be sold in 26-oz. bottles each making four pints.

Prune and dried fruits imports

Prunes and certain dried tree fruits may be imported under licence from the U.S.A., using dollars made available under the Mutual Security Act.

Announcing these arrangements, the Board of Trade say that applications for licences will be considered from traders who can produce evidence that a firm order has been placed subject to the issue of an import licence and who undertake to carry out the special procedure required in connection with imports from the U.S.A. under the Mutual Security Act.

Coffee bean quota

Import licensing arrangements for raw coffee beans from dollar sources announced by the Board of Trade last year are to remain the same. There is to be a quota for the import of raw coffee beans for the year ending August 31, 1956.

Applications for licences will be considered from traders who have been importing beans under the previous arrangements and from those who can provide evidence that they have placed firm orders subject to the issue of an import licence.

Magnetic separator

Rapid Magnetic Machines Ltd., Birmingham, state that they have been sole licensees for the Crockett heavy media magnetic separator for many years, and that they co-operate with Dings of U.S.A. in this field.

Rapid Magnetic Machines have no connection with any other concern purporting to manufacture "Crockett Type" separators.

Ices by air

An "ice-cream airlift" has been organised to the Outer Hebrides by Mr. Angus MacDonald, who sells ice cream at Lough Maddy on North Uist, and T. Wall and Sons Ltd.

Every Saturday morning, Mr. McDonald motors to Benbecula, on South Uist. There he picks up a container of ice cream flown in from Renfrew, where it is put aboard the aircraft by a special van sent from Wall's Glasgow depot. Mr. McDonald believes that he has established Britain's most northerly ice-cream agency.

New adhesives

A new product developed by National Adhesives Ltd. is synthetic remoistening gum, which is non-curling, non-blocking and claimed to be resistant to extreme climatic conditions. Known as *Enva-lok* the gum is recommended for band labels, particularly on export work.

Other products include an aqueous adhesive for film-laminated board used in the manufacture of record sleeves, folding cartons, etc., and an aqueous adhesive to stick transparent film to waxed board for frozen food packs.

100% clean fruit

Dried fruit has been introduced by Whitworths Holdings Ltd. which, they claim, is the first to be put on the British market which has been washed 100% clean.

The fruit, which is ready for use by the customer without further cleaning or sieving, is said to achieve its perfect cleanliness through a new washing process, the machines for which were designed and made in Whitworth's own machinery shops. After all stalks and other impurities have been removed by the machines the fruit is air-dried and packed.

Competition closes sugar refinery

One of Greenock's three refineries—the 124-year-old Glebe Sugar Refinery—has been closed down for economic reasons. About 200 employees are affected.

The Glebe refinery, which is the smallest of the three, has closed down twice before in the last three years because of competition in refined sugar in the home market and the cessation of export orders from the Clyde. This time the closure will be permanent.

According to the official announcement heavy expenditure on new plant would be necessary to maintain the refinery and this could not be justified without a large increase in the demand for refined sugar, of which there is no prospect in the near future. New machinery had been installed in the refinery including a 1,000-ton silo which had never been used.

"Something for a penny." Harradines have introduced this popular line of fizzy sweets at a very popular price for the child with only a few coppers to spend.

Christmas confectionery

Speciality products for the Christmas trade have been introduced by J. Harradine and Sons Ltd. They include Chinese crystallised ginger in ½ lb. and 4 lb. boxes; preserved stem ginger in syrup, bottled in 24 oz. fancy globe jars; and glacé pineapple packed in 8-oz. cartons. The company are also presenting *Brytees* — silver dragees tinted in many different colours—and a range of coloured edible cake decorations for the housewife who wishes to decorate the results of her cake mix as well as for those who bake in the conventional way. Coloured coffee sugar for the home market and for the new coffee houses is presented in a novel pack containing a "cut-out" picture of a sugar bowl through which the contents are visible. For the children, Harradines are selling *Bambies*, fizzy sweets selling at 1d. per tube.

Economic facts for workers

An appeal for employers to organise a campaign to tell employees about the workings of the industrial system was made by Lt.-Col. Maurice W. Batchelor, J.P., chairman of Batchelors Peas, Ltd., last month. He was speaking at a meeting of executives of the firm's Southall factory.

"I am convinced," he said, "that the average employee just does not understand the forces which operate economically today. While his day's work is the way in which he—as an individual—earns a living, it also affects the livelihood of many other people and is a part of the large-scale economy of the country. It is up to employers to explain this—in the past the bosses have been too reticent.

"Already there has been resistance to automation through lack of information . . . I think we shall find that automation will ultimately be recognised as the workers' best friend. . . . In our factories we have had automatic canning lines for some time. As we introduce these changes, however, we have tried to explain the reasons to our employees."

New plum flavour

The flavour of Victoria plums has been added by W. J. Bush and Co. Ltd. to its Witham series of "true-to-the-fruit" flavours. The company claims that the new flavour may be used to great effect in sugar confectionery in high boilings, fondant creams and all types of jelly sweets. It is also recommended for cornflour products, jelly crystals and squares. The company offers recipes for drop boilings, fondant creams, pectin jellies and other goods incorporating the new flavour. For the preparation of jelly crystals it is suggested that a powder flavour should be used and for this purpose *Tru-Sil* Witham plum flavour is recommended. A special quality of the flavour is available for use in ice cream and in the preparation of syrups for cordials.

Hydrometers for use in milk

A revised edition of B.S. 734, "Density hydrometers for use in milk," which was originally published in 1937, has been issued by the British Standards Institution. The constructional requirements for the hydrometers have been revised so as to remove difficulties in production without affecting accuracy, and certain details which were formerly mandatory requirements are now given only for the guidance of manufacturers. The modifications do not, however, permit undue departure from the original specification.

The standard gives requirements for two ranges of hydrometer, *i.e.* for use in normal milk and for use in milks of low density. Each range consists of three types to meet the variation in volume of milk samples available. The types, form, materials and construction, dimensions and graduations are given together with details of hydrometer jars, and a set of tables for use with the hydrometers is provided.

Copies of this standard are obtainable from the British Standards Institution, 2, Park Street, London, W.1, price 10s. 6d. net.

Food News Overseas

New dairy laboratory

A new laboratory has been occupied by the Dairy Research Section of the Commonwealth Scientific and Industrial Research Organisation in Australia. The new address of the section is P.O. Box 20, Highett, S.21 Victoria.

New Iraqui sugar plant

The Development Board and the Ministry of Development of the Government of Iraq have authorised the erection of a complete sugar plant and its related power station, near Mosul in Northern Iraq. The plant is intended to treat daily 800 metric tons of sugar beet grown in this district and is designed to refine imported raw cane-sugar in the off sugar-beet season.

Award for bread process

The American Dry Milk Institute, Inc., Chicago, Illinois, has received an award for "outstanding service to the industry which it represents as well as to the American public." The award was made for the Institute's successful technical research programme entitled "A Revolutionary New Process for Bread Making." This is the A.D.M.I. stable ferment process for the commercial production of bread and other yeast raised foods with the use of 6% non-fat dry milk.

The process is said to have numerous production and economic advantages for the baker and to produce an exceptionally good loaf of bread, improved physically and nutritionally, and with greater consumer appeal.

Whipping agent for low density sweets

A whipping agent for confectionery, known as *Hyfoama*, has been introduced by Lenderink and Co. N.V. of Schiedam, Holland, which is claimed to decrease the density of toffees, caramels, etc., so as to produce large pieces at an economical price. With small changes in the recipes (*e.g.* boiling a few degrees lower) the masses produced are said to be useful as centres for toffee bars, etc. A number of recipes for toffees, caramels and centres for filling and folding are obtainable from the company. A typical recipe, for producing a light whole milk toffee at a density of 1.10, uses 4 oz. of *Hyfoama* to 41 lb. 8 oz. of the finished product.

Brazil to build grain silos

Brazil is to build 103 warehouses and silos in her producing areas with a total capacity of 532,000 tons to help solve her cereal storage problem. The plan has been drawn up by the Brazilian Rural Federation and approved by the National Bank for Economic Development. The Federation has appointed a committee to organise a corporation to be called "Rede Nacional de Armazens e Silos S.A." which will have an initial capital of Crs. 10 million. Under the same plan, 52 warehouses and silos are to be built in the north eastern drought areas.

Surplus Spanish rice

Spanish breweries and bakeries should use more home-grown rice according to the Madrid newspaper *Ya*. At present Spanish production of rice is 400,000 tons annually while her consumption is only 250,000 tons. Plans for selling the surplus have included its export to Japan, which is admitted as being "only a temporary solution," and the formation of a rice "pool" consisting of 100,000 tons Spanish, 200,000 tons Egyptian and 300,000 tons of Italian rice. Talks which were in progress in Rome on the formation of such a pool have now been suspended.

Surplus food to pay for development schemes

The use of food surpluses to finance economic development projects in under-developed countries is envisaged in a new report issued by the F.A.O. The report includes a pilot study of how the plan would work in India. It presents a number of Indian projects which could be added to the present Indian development programme if financed by food surpluses. In this way three-quarters of the milk marketing development for the city of Calcutta, and the entire forest development programme for the Andaman islands could be financed from the value of the food surpluses used. The net profits from the forest development programme could be used on additional logging operations.

A detailed economic analysis of how development projects could be set up to use the surpluses without depressing markets and of the kind of projects which would meet these conditions is included in the report, which also considers the difficulties of measuring just how much surplus food could be used in this way.

Potato import ban lifted

The Swedish ban on potato imports has been lifted by the Swedish Agricultural Marketing Board. First class potatoes may be imported subject to a duty of five oere per kilo.

The ban was introduced in August, chiefly at the request of the National Plant Protection Institute, which was to make tests on the quality of domestic and imported potatoes.

Russia mechanises food production

Mechanised meat packing, automatic sugar-refining plant and continuous confectionery machinery are among the plant described recently in the Russian journal *Planovoye Khoziaistvo* (*Planned Economy*) to demonstrate the modernisation of Russia's food industry.

Improvements in meat packing machinery can release 35 workers on frankfurter sausage production lines, while an automatic machine is claimed to manufacture 10 times the former production of meat dumplings. Complete production lines are expected to include continuous quick-freezing apparatus. Poultry-processing conveyors which will release 40 workers per 3,000 heads processed, and which will halve costs have been introduced.

Juice filtration in sugar beet factories has been mechanised with a drum-type vacuum-filter for the first and second purifications. Methods are also available for extracting white sugar from the feeding molasses by-product of beet-sugar refining by a lime precipitation process, though equipment is not generally available.

Continuous caramel production lines are available in the confectionery industry. Experiments are being made by the research association of this industry into the automatic manufacture of candied fruits. A machine has been designed to mix dough for sugar pastry.

Bottle-washing machinery, filling machines and butter-making machines are being installed in dairies. One machine is said to make butter in 40 min. instead of 18 hr. by previous methods.

Hydraulic presses for the manufacture of vegetable fats and oils are being replaced by modern equipment including continuous screw presses. In the cereals industry a new system is being developed for storing and transporting flour without using bags.

Wrapped bananas for Britain

All bananas shipped to the U.K. from Jamaica are now wrapped in *Diothene* as a protection against damage in handling. During the first five months of 1955, 3,868,667 stems were exported, all to the U.K.

Food from sun and seaweed

Large-scale algae culture will be discussed at an international conference on the scientific basis of applied solar energy to be held at the University of Arizona, Tucson, from October 31 to November 1 as a prelude to the world symposium on applied solar energy to be held in Phœnix, Arizona, from November 2 to 4.

Kenya to have sugar refinery

A public company, Sugar Refiners of East Africa Ltd., is being formed in Kenya to build a £250,000 sugar refinery on a 10-acre site at Mombasa. The refinery is being planned for an initial output of 150 tons a day; at first the factory will import raw sugar, from Commonwealth sources, but it is hoped to take local sugar as production expands in the Nyanza Province of Kenya, where the Government is now encouraging development.

Kenya Legislative Council has extended for a further year, to June 30, 1956, the life of the Sugar Consumption Tax Ordinance. The Ordinance imposes a tax of one cent of a shilling per lb. on all sugar consumed in Kenya (a subsidy of 2 cents per lb. is paid to manufacturers to encourage sugar production).

Brillat-Savarin commemoration at catering show

The Second International Hotel and Catering Exhibition is to be held in Paris Parc des Expositions, Porte de Versailles, from November 10 to 21.

The most up-to-date catering equipment will be on show, including the newest ideas and labour-saving devices. It is essentially a technical exhibition, presenting new machinery, new methods, new materials. Nevertheless, certain important gastronomic events are scheduled to take place during the exhibition.

This year France commemorates the 200th anniversary of the death of Brillat-Savarin, the greatest chef of all time, and a philosopher of no little merit. This celebration will take place on November 14 and will include a solemn High Mass, which will be attended by all the Brotherhoods connected with Gastronomy or Wine. This will be followed by a ceremony at the Sorbonne under the chairmanship of the President of France.

The four finalists, chosen from the best cooks in France, will then compete for the Brillat-Savarin prize.

Experimental sugar beet plant

Sugar beet processing plant, suitably equipped and scaled down to a size convenient for scientific investigation, is being built at the U.S. Department of Agriculture's Western Regional Research Laboratory. Experiments which would be too expensive or impractical if attempted on a commercial scale will be made by using the plant.

The equipment has been installed in two rooms. The first, for slicing and sampling, can be held at a low temperature while a larger room (26 × 48 ft.) holds most of the processing equipment, instrumental control apparatus, and laboratory furniture. The walls, ceilings, floors and equipment have been constructed to resist the corrosive effects of high humidity and to allow rigid sanitary control.

Funds for the new plant, which is said to be the first of its kind in the United States, have been provided by the Beet Sugar Development Foundation.

OVERSEAS ENQUIRIES

Cuba: Fish

Sr. Jose M. Catasus, San Fermin 374, Santiago de Cuba, wishes to obtain U.K. agencies on a commission basis for salted codfish (bacalao), tinned sardines and smoked herrings, etc.

Interested exporters should write direct to Sr. Catasus, at the same time notifying the Commercial Secretariat, British Embassy, Apartado 1069, Havana, that they have done so.

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Netherlands: Food machinery

N. V. Technisch Bureau W. Seibert and Co., Statenlaan 18, Bussum, are interested in representing British manufacturers of machinery for the food industry. They are considered to be a suitable connection for United Kingdom firms.

Interested manufacturers should write direct to the Netherlands concern, at the same time notifying the Commercial Department, British Embassy, Lange Voorhout 32, The Hague, that they have done so.

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Saudi Arabia: various foods

Three Saudi Arabian companies are interested in receiving offers from British suppliers of canned goods, biscuits, confectionery and other foods. They are Abdulmohsin Abdulaal, Ahmed Ismail Khalil, and Nassar al Aamer al Remeih, all of Medina.

Interested suppliers should send catalogues, samples and c.i.f. Jedda prices direct to these firms, at the same time notifying the Commercial Secretariat, British Embassy, Jedda that they have done so.

British East Africa: Frozen foods

The African Trading Co. Ltd., P.O. Box 1194, Dar es Salaam, are keen to do direct business on a principal to principal basis with British suppliers of refrigerated butter and fruit and other commodities. They would also be interested in taking on agencies.

Interested suppliers should write direct to The African Trading Co. Ltd. with full details of their offers, at the same time notifying the U.K. Trade Commissioner in East Africa, P.O. Box 220, Memorial Hall, Nairobi, Kenya.

Canada: Kippers

A. Roy Clouston and Sons Ltd., 407, McGill Street, Montreal, are interested in getting in touch with British suppliers of kippers.

The company are sea-food brokers. They are considered to be a suitable connection for United Kingdom firms.

Interested suppliers should write direct to Mr. A. Roy Clouston Snr., at the same time notifying the U.K. Trade Commissioner, 1111, Beaver Hall Hill, Montreal, that they have done so.

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Persia: Sugar plant

Prince Abounasr Azod, Sugar Beet Erection Bureau, Avenue Shiraz, Rue Sepia, Tehran, is interested in obtaining quotations from British firms for a sugar factory to convert raw sugar into white sugar. The factory, which would use imported sugar, would be set up near Ahwaz, and should have a production of 60 tons a day.

Interested manufacturers should write direct to Prince Azod, at the same time notifying the Commercial Section, British Embassy, Avenue Firdausi, Tehran.

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U.S.A.: Scotch whisky

Mr. Harold J. Frisch, President of Frisch Importers Inc., 315, West Chicago Avenue, Chicago 10, Illinois, would like to receive quotations from British firms who are able to offer Scotch whisky either in bulk or else in bottles bearing one of Mr. Frisch's seven private labels.

Most of Mr. Frisch's business is in 4 year old Scotch whisky, but he would also be interested in offers of 8 year old, 10 year old, 12 year old and 15 year old lines. Mr. Frisch envisages minimum orders of 100 cases, and would expect on occasions to order from 200 to 500 cases at a time.

Exporters interested in this enquiry should write by air mail direct to Mr. Frisch with full details of their offers and quotations in U.S. dollars c.i.f. Chicago, at the same time sending a copy of their initial correspondence to the British Consulate-General, 720, North Michigan Avenue, Chicago 11, Illinois.

Food Packaging

Cotton self-adhesive tape which can be treated with rotproofing or mouldproofing agents.

Fish sticks packed in a wax carton wrapped in six-colour "Diophane."

Cheaper cotton sealing tape

Cotton self-adhesive tape which is claimed to be cheaper than any other self-adhesive tape on the market is being marketed by P. P. Payne and Sons Ltd., under the trade name *Jiffy-tape*. The makers say that it is stronger than other self-adhesive tape so that a narrower width serves the same purpose.

The tape is produced from cotton yarn reinforced along its entire length and bonded together with a pressure-sensitive adhesive. It is obtainable in the following widths: 3, 4, 5, 6, 7 and 9 mm. Waterproof and standard qualities are available and the tape base material can be treated with rot and mouldproofing agents without materially affecting its properties. The company has produced two booklets dealing with the specifications of both the standard and waterproof qualities.

Fibre-foil biscuit pack

Parkinson's Biscuits Ltd. are now marketing their *Chocolette* biscuits in a neat brick-shaped 8-oz. pack. The fibre foil wrapper, lined with greaseproof paper, is attractively decorated with coloured reproductions of the biscuits on a silver and blue background. The lettering is in dark brown and white.

Buttered brazils doubly protected

A multi-colour gravure *Diolam* wrapped pack is being used by Hawkes Brothers Ltd. of Chelmsford for the first time in marketing their buttered brazils. The *Diolam* wrapping, a laminate of *Diophane* cellulose film, in addition to providing added protection for the sweets, has "sandwiched" print which adds lustre and enrichment to the colours seen through the high gloss of the film.

The wrapper has gloss gold and maroon panels. The name of the sweets is prominently featured in black on a white central panel and is supported by half-tones of the sweets themselves. The result is a gay and colourful pack.

The wrapper was manufactured, designed and printed by Transparent Paper Ltd.

"Embroidered" alphabet tin

An "embroidered" alphabet has been used to decorate a new biscuit tin produced by Reads of Liverpool for Carr and Co. Ltd. It is called the *Party-time* tin and follows the success of the *Sampler* biscuit tin which was introduced last year. The new tin has a design theme of a children's alphabet with embroidered figures corresponding to each letter of the alphabet and amusing rhyming couplets of deliberately simple phrasing.

The attractiveness of the main design is further enhanced by the background of small floral clusters and a particularly ingenious touch is the incorporation in the design of the name "Carr's" which is so formed of background flowers and leaves as to merge unobtrusively into the over-all composition, without detracting from the general effect.

The children's alphabet on Carr's biscuit tin is based on an "embroidery" design.

Multi-colour pack for fish sticks

To introduce their Eskimo Brand of "fish stick," a product proving such a success in the United States, Grimsby Frozen Food Products Ltd. have chosen a pack consisting of a waxed carton overwrapped in a protective and distinctive six-colour reverse printed *Diobhane* cellulose film wrapper. Appropriately the predominating colour is a medium sea blue, which forms an excellent background to the half-tone reproduction of a housewife dishing up an appetising plate of "pan-ready" fish sticks. The half-tone of the fish sticks themselves is particularly striking and provides an excellent impression of the product inside the pack.

This 300 gauge moistureproof, heat-sealing, anchored transparent (quick freezing quality) wrapper was designed, manufactured and printed by Transparent Paper Ltd.

Plastic can liner

Aseptic canning for dairy foods, soups, vegetables and many other products is said to be possible by using a new heat-resistant liner for metal containers, developed by the Crown Cork and Seal Co. of Baltimore, U.S.A. The resinous plastic-like liner is said to have excellent chemical resistance and superior adhesion and fabrication properties, in addition to being heat-resistant. Besides pre-sterilisation of the food and can filling in an aseptic manner, the process requires pre-sterilisation of the container at 500°F.

New Companies

N. Reich, Ltd. (548242.) Merchants, factors, dealers in and producers of eggs, dairy products, etc. £30,000. Dirs.: not named. Subs.: M. Reach and G. Reach.

Cyril John, Ltd. (548264.) 41, Goldsmith Avenue, Acton, London, W.3. Importers and merchants of meat, pork butchers, slaughterers, etc. £100. Dirs.: C. J. W. Wright and G. J. Wright, C. J. Saunders.

J. P. and G. Hacking, Ltd. (548296.) 31-33, Price Street, Birkenhead. Packers, canners, processors, merchants of and dealers in nuts, raisins, fruits, savouries, comestibles, etc. £3,000. Permt. dirs.: J. P. Hacking and G. Hacking.

John Browning, Ltd. (548311.) Manufacturers and caterers and dealers in frozen meats, fish, poultry, game, dairy produce, fruits, etc. £10,000. Dirs.: to be appointed by subs. Subs.: M. I. Worldley and F. M. Baxter, 6, Austin Friars, London, E.C.2.

D. S. Hayes, Ltd. (548345.) 44, High Street, Oakham, Rutland. Fruit and vegetable merchants, poulterers, game and fish merchants, etc. £1,000. Dirs.: E. D. Hayes and D. K. Hayes, R. Bilsdon.

E.P.S., Ltd. (548349.) To investigate and carry out general or specific research into the packaging and transport of goods of all kinds and into all processes involved in the production and marketing of packing, containers, boxes and packages of all kinds, etc. £100. Dirs.: not named. Subs.: R. A. Fraser and W. C. Willis, 11, Old Jewry, London, E.C.2.

Premier Closures, Ltd. (548431.) Manufacturers of and dealers in articles for closing or sealing drums, bottles, etc. £10,000. Dirs.: to be appointed by subs. Subs.: C. Bance, 7, Breakspeare Road, Ruislip, Mddx., and N. H. Giles.

From Jordan and Sons Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

New Scottish Companies

Renesol Products, Ltd. Manufacturers of and dealers in foodstuffs, produce and provisions, groceries, etc. £100. Dirs.: not named. Subscribers: Alasdair J. McKichan and R. B. Jack, 172, St. Vincent Street, Glasgow.

The Kiptenden Farming Co., Ltd. 5, Thistle Street, Edinburgh. Farmers, market gardeners, dairymen, etc. £10,000. Dirs.: Mrs. Marjorie Linklater, A. MacIntyre, C. J. Y. Dallmeyer and M. Lorimer.

Edinburgh Delicacies Centre, Ltd. 7, Barony Street, Edinburgh. Cooked meat manufacturers, pastry cooks, butchers, bakers, grocers, etc. £400. Dir.: B. Wendorff.

The River Ness Fishing Co. (1955), Ltd. Fishing by trawl or otherwise, etc. £10,000. Dirs.: David B. Craig, George Craig and Miss L. B. Craig.

Vending Machines (Glasgow), Ltd. 28, Princes Street, Port Glasgow. Manufacturers of and dealers in coffee vending machines and other types of slot machines, etc. £100. Dirs.: not named. Subs.: Samuel E. Norman, 294, High Road, Ilford, Essex, and L. E. Norman, Coopersale Hall, Epping, Essex.

The Leonard Hill Technical Group this month

Manufacturing Chemist.—Improving Yields in Antibiotics Manufacture; The Analysis of Polyethylene Glycols and their Derivatives; Hexachlorophene and Perfumes; Smith and Nephew Ltd.'s new "Elastoplast" Factory in S. Africa; Progress Reports: Cosmetics and Toilet Preparations; Fertilisers and Plant Nutrients; Analytical Chemistry.

Dairy Engineering. — The Choice of Vehicles for the Perfect Delivery Service; Battery Charges for the Electric Delivery Vehicle; Milk Distribution in New Zealand; Vehicles for the Transport of Milk in Bulk; Training the Milk Salesman; Transport for Feeder and Pick-up Routes; Milk Consumption North of the Border.

World Crops.—The Application of the Hand Tractor in Underdeveloped Areas; Developments in Motorised Agricultural Machinery; Progress in the Mechanisation of Farming in the Colonial Territories.

Chemical and Process Engineering.—Ozone and its Uses in Industry; Production of Electricity from Salt and Fresh Water without Fuel; A Small-Capacity Equilibrium Still; Current Trends in Automatic Process Control; New Chemical Engineering Developments at the Engineering, Marine, Welding and Foundry Trades Exhibition.

Corrosion Technology.—Magnetic Treatment of Water; Corrosion Problems in Dyeing and Finishing Works; The Painting of Ships; Important Advances in Bituminous Products.

Fibres.—Softening Hard Cuttings of Jute with Diammonium Hydrogen Phosphate; Orlon Acrylic Fibre; The Uster Spectrograph—its Application in the Man-Made and Synthetic Fibre Industries; Flock Printing — a Growing Fashion; Improving Natural Fibres; Molecular Bonding Aids new Textile Finishing Processes.

Petroleum.—Stores Operations in the Oil Industry Overseas; Control of Engine Knock through Gasoline and Air Composition; Focus on Rheology.

Paint Manufacture.—Improved Plant for Paint Manufacture; New Installation in Australia; Keeping the Paint Factory Within the Law; Conjugation in Drying Oils.

COMPANY MEETING

Geo. Adlam and Sons

(Manufacturers of plant and machinery for chemical, brewery, bottling and refrigerating, vinegar brewers, chocolate and other food manufacturers)

Improved Financial Position

The forty-eighth annual general meeting was held on August 26, in Bristol. The net profit for the year, before taxation, amounted to £40,197 against £38,762 for the previous year.

After taxation and provisions for dividend on the Ordinary share capital of 2d. per share, comparable with 1½d. on last year's capital, £7,608 was added to the balance carried forward.

The following are extracts from the circulated statement by the chairman, Mr. W. Walker, J.P., F.A.C.C.A.:

The profit on trading was somewhat higher, but this was compensated by increased depreciation charges consequent upon the revaluation of fixed assets. The final net taxed profit exceeded that of the previous year by £989.

The liquid position of the company has been improved, and the amounts due to bankers and creditors again reduced. The deficiency of current assets below liabilities at March, 1952, was £82,929: at March, 1955, it was only £1,915, a much healthier financial position.

The reduction in liabilities arises partly by profits being retained in the business and partly by reduction of stocks excessive in relation to turnover. Work-in-progress has been reduced by speedier completion of work, and to a smaller extent by reason of a reduced order book. The sales in the year 1954-55 were lower than the preceding year, but economies in the works enabled the earning of a similar profit.

I referred last year to the changing nature of requirements by customers now that heavy special post-war replacements had been made. Certain types of order, especially where your company designs a complete brewery and supervises its erection, take some two or three years to execute, and the equipment is not made in the factories for some time after receipt of the order. Orders for immediate delivery are now lower than for the post-war years, but there is a good actual and potential order position for some time ahead.

The extension of the business into new products continues; in some cases initial difficulties are now overcome and normal production is taking place: other products are still in the development stage.

The directors feel that some relaxation, having regard to future potential, can be made on dividend policy. Accordingly, a dividend of 2d. per share on the new Ordinary capital is recommended.

The report was adopted.

Information and Advice

This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Pie glaze

B.7585. *Please give a formula for pie glaze.* (Liverpool)

The following may be used as a basis for experiment:

Gelatin	1 lb.
Water	1 pint
Cornflour	9 oz.

Soak the gelatin in its own weight of boiling water before use.

Sauerkraut manufacture and canning

B.7480. *Please give me a recipe for canning sauerkraut.* (Eastbourne)

Sauerkraut is obtained by the full fermentation, chiefly lactic, of properly prepared and shredded cabbage with between 2-3% of salt. Cabbages should be firm and only sound heads, fully matured with the outer green leaves removed, should be used. Any good white cabbage can be used, but savoys are not suitable.

It is necessary to let the cabbage wilt, otherwise it will be too brittle to cut and will break into small pieces instead of shredding. The cabbages are cored and the green, withered and dirty outside leaves removed. The cored cabbage is cut into very fine shreds after being washed and salted. The usual proportion of salt is 2½% by weight. The salt is well mixed with the shredded cabbage as the tank or other container is filled.

Large circular wooden vats are used for commercial fermentation and storage, and heavy pressure is applied to the cabbage by a false wooden head. The pressure and salt extract juice from the cabbage, and a brine, which completely covers the cabbage, is soon formed. Gas evolution is vigorous during the first stages of fermentation. A temperature of 65°F. is best for fermentation. If the cabbage is cold when shredded, it should be warmed to 65-70°F. in the tanks. The fermentation room should also be warmed, if much below this temperature.

Fermentation should be complete in a week or ten days. The proper acid content should be about 1·6-1·8%, expressed as lactic acid.

When fermentation is complete, the tanks should be sealed to exclude air, if the sauerkraut is to be stored. Prompt canning of the sauerkraut after opening the tank helps to avoid discoloration.

For canning, the sauerkraut is boiled in steam-jacketed kettles and is packed hot into cans in its own brine (hot fresh brine being added if necessary). The cans are sealed and sterilised under steam pressure. In some factories the sauerkraut is heated in jacketed glass-lined kettles, drained and canned. The cans are filled with the hot juice, given an exhaust, sealed and processed a short time in steam—long enough for the contents to reach 180°F. Some loss of canned sauerkraut occurs from the development of hydrogen by the action of the acid of the sauerkraut on the tinplate. A freshly opened can has a disagreeable odour but this disappears during cooking.

Many of these troubles can be eliminated by prompt cooling of the cans.

Cashew nut cream

B.7528. *How is cashew nut cream prepared? Presumably water would be added, so would pasteurising or sterilising be necessary?* (Eastbourne)

Although this product is termed "cream" it is simply prepared by the plain milling of lightly roasted kernels. No pasteurisation or other heat processing is necessary and no preservatives need be added.

The kernels have a low moisture content of 5-7% and a high oil content 45% so that there is not enough water available for bacterial, mould, or yeast growth. In fact, the light roasting is not really necessary because of this low moisture content, but it does help the milling process to some extent.

Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials and also general information as follows:

B.7574. *Makers of equipment for bottling edible oils.* (Slough)

B.7575. *Makers of cheese wrappings.* (The Hague, Holland)

B.7576. *Makers of moisture meter.* (Veradens, Switzerland)

B.7577. *Suppliers of stainless steel spades.* (Tipperary)

B.7578. *Makers of stainless steel juice extractor.* (Bombay)

B.7579. *Names of foods containing small amounts of arsenic.* (London, E.12)

B.7581. *Makers of wide-range moisture meter.* (Tel Aviv, Israel)

B.7582. *Suppliers of fungal enzymes for bakeries.* (Dublin)

B.7583. *Machinery for shelling hard-shelled nuts* (Colombo, Ceylon)

B.7584. *Makers of vegetable chopping machines.* (Boston, Lincs.)

B.7585. *Recipe for pie glaze.* (Liverpool)

B.7586. *Advice on making apple and damson pulp.* (Ballieboro', Co. Cavan, Eire)

B.7587. *Suppliers of pea viners.* (Bristol)

B.7589. *Recipe for chow chow.* (London, W.2)

B.7591. *Manufacturer of slicing machine for citron peel caps.* (Hove)

B.7592. *Information on sterilising lamp.* (Leicester)

B.7593. *Information on fungal enzymes.* (Liverpool)

B.7594. *Maker of malted milk preparation.* (Hyde, Cheshire)

B.7595. *Manufacturer of white cake mix.* (Brisbane)

B.7598. *Information on sausage extenders.* (Luton, Beds.)

B.7599. *Manufacturer of can vacuum seamers.* (Waterford, Eire)

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

738,818. M. Ruben: Coffee preparations and preparations for use with them.
738,765. D. R. Bomford: Power-operated vegetable cutting apparatus.
738,898. S.A. Macchine Industria Dolciaria Carle E Montanari: Filling machine for the production of stuffed caramels.
738,679. International Minerals and Chemical Corp.: Animal food compositions.
738,719. J. Harper and Co., Ltd.: Machines for mincing meat or other foodstuffs.
738,371. J. N. Read: Method of rendering the surface of a bread or cake baking pan anti-adhesive.
738,151. Italcolloid Soc Pee Azioni: Manufacture of cheese.
738,274. S. J. Young: Pasteurisation or sterilisation of liquids contained in drums.
738,558. H. Simon (Holdings), Ltd.: Feeding devices for roller mills for cereal products.
737,372, 737,450 and 737,446. A. K. Ozai-Durrani: Quick cooking rice and method of preparation.
737,782. A.P.V. Co., Ltd.: Process and apparatus for the treatment of brewers' worts.
737,882. Crown Cork Co., Ltd.: Labelling machines.
738,015. J. N. Wiser: Bottling and preserving of liquids.
737,894. J. Levitin: Devices for peeling citrus fruits.
738,025. Pfeifer and Langeln Koln and Braunschweigische Maschinenbauanstalt: Extraction of sugar beet sections.
738,104. Ekco Products Co.: Food packaging unit.

ABSTRACTS OF BRITISH PATENTS

Ice trays

A flexible tray has block forming compartments each formed with two opposed concave walls and a semi-cylindrical wall connecting the concave walls. The arrangement is such that each block is rotatably removable (by twisting the tray) without binding on the side walls.—725,956. *General Electric Co. (U.S.A.).*

Food packs

Pickled vegetables in a preserving liquid are sealed in a container of flexible, impermeable material such as polythene.—726,098. *J. H. Johnson et al.*

Gluten for improving foods

The incorporation of a stable emulsion of gluten into soups, sausage meats, salad creams, ice creams and many other foodstuffs is claimed to improve them. The gluten emulsions contain a considerably higher proportion of assimilable nitrogen in the form of water-soluble nitrogenous compounds than does gluten itself, and when incorporated into foods, these have a greatly increased "assimilable protein content." The emulsion acts as an emulsifying agent, thus facilitating the preparation of salad creams, ice creams, etc. The gluten emulsion is said to exhibit bacteriostatic properties against a number of both gram-positive and gram-negative organisms.

Several examples are given of the incorporation of the gluten emulsion into various types of bread, emulsified foods, proteinaceous foods, salmon creme and sausages. For example, a formula for wheatmeal bread, dough period 2½ hrs. to oven, using a fine wheatmeal, is as follows:

Wheatmeal	.. ..	30 lb.
Salt	.. .. ..	12 oz.
Gluten emulsion	..	1 pt.
Water	.. .. ..	17½ lb.

Dough temperature 74°F.

Prepared from Canadian flour. Final proving time approximately 50 min.—733,225. *P. S. Jewell and J. G. Travis King.*

Processing cocoa beans

The shell and kernel parts of beans prepared by breaking, crushing, etc., are electrostatically separated by a vibrated conveyor forming one electrode (preferably the positive electrode) and on to which the material is fed, and by rotating rollers forming the other electrode and spaced above the conveyor, the impurities being stripped or sucked off the rollers..—726,138. *J. Toth.*

Bread making machines

An automatic machine for making, baking and de-panning bakery products such as bread, includes an endless pan conveyor to which baking pans are attached, means for supplying a lining material to the pans and means for filling the pans when lined.—726,440. *S. Liston.*

Crown closures

The sealing element of a crown closure consists of a ring of solid high polymer substance deformable by the capping pressure without heat, the annular face of which facing the inner bottom face of the closure has a radial width smaller than the extension parallel to the axis of the ring of the external cylindrical face of the sealing element.—726,520. *F. Wolff.*

Bottle stopper

A cylindrical stopper for bottles, etc., is combined with an extracting device comprising an internally threaded ring with an internal diameter equal to the external diameter of the stopper, screwed on to the stopper before it is inserted into the mouth of the bottle and bearing against the edge of the bottle mouth.—726,521. *B. Cortat.*

Crate stacking apparatus

Milk bottle crates may be automatically stacked to any desired height with an apparatus consisting of a vertical sliding frame fitted with lifting fingers and operated by an electric motor through a single revolution type of clutch gear. Crates arriving at the apparatus actuate a contact member which engages the clutch and drives the crank wheel round one complete revolution. This lowers the frame so that the lifting fingers engage in the crate and on the upward movement of the frame the crate is carried with it. The apparatus is automatically stopped when the desired number of crates have been stacked by the action of an adjustable control stop which is arranged to be engaged by the uppermost crate.—731,496. *B. G. Tolley.*

Cooling milk churns

An appliance for the temporary cooling of milk churns consists of a perforated pan which is placed over the churn and one or more cooled agitators formed by return tubes, which are suspended inside the churn. These agitators are surmounted by a bucket divided into two halves. Cold water flows through the tubes of the agitator and spills out at the other end into alternate halves of the bucket, causing it to rock and spill out the water into the perforated pan. Thus the milk in the churn is cooled by the swinging backwards and forwards of the agitator tubes, while the divided bucket rocks the water through the perforated pan into streams on the outside of the churn.—731,948. *Gascoignes (Reading), Ltd., and J. A. Kingston.*

ABSTRACTS OF FOREIGN PATENTS

Clarifying raw sugar

Raw sugar or brown sugar is clarified for the manufacture of refined sugar by heating a solution of the raw sugar to 50°-100°C., adding milk of lime to a *p*H 9·5-11·5, filtering and heating to 70°-100°C.—Indian 51,893.

Antioxidant flakes

Butylated hydroxyanisole in the form of sub-divided, free-flowing and non-fusing solid flakes is prepared from a composition containing at least 80% by weight of 3-*tert*-butyl-4-hydroxyanisole and 20% or less 2-tert-butyl-4-hydroxyanisole.—U.S. 2,704,746 (through *Chem. Abst.*).

Concentrated milk

The composition of milk is adjusted to contain 2·5-6·0% fat and 12-23% non-fat solids. A necessary amount of ferrous ammonium lactate, ferrous sulphate, calcium lactate and vitamin D are added to the milk. The mixture is homogenised, sprayed into a vacuum chamber with wet steam at 95° for deodorisation and sterilisation and then concentrated *in vacuo* to the original composition.—Japanese 3,238.

Mayonnaise manufacture

Mayonnaise and other emulsified sauces can be made by adding to the oil about 1% of an edible emulsion consisting of the partial ester of a polyhydric alcohol having 15-30 carbon atoms and a fatty acid having 10-18 carbon atoms.—Spanish 205,675.

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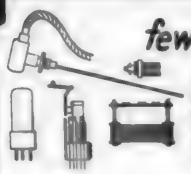

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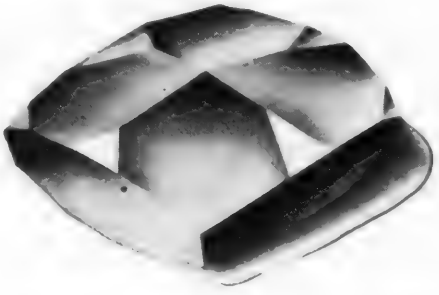

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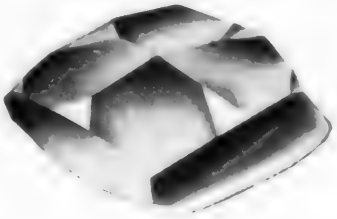

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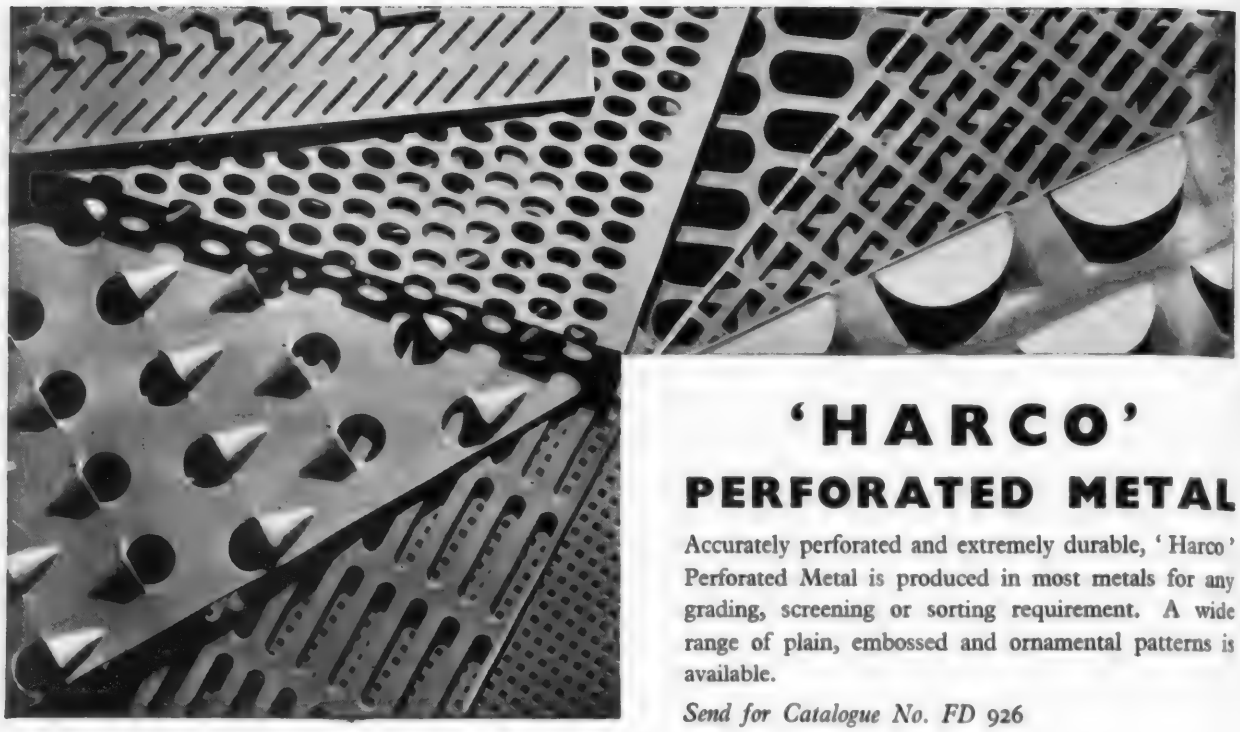

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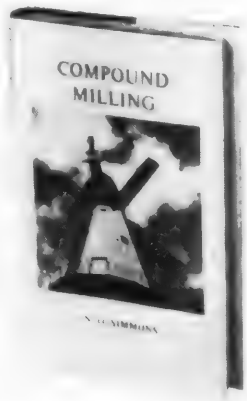

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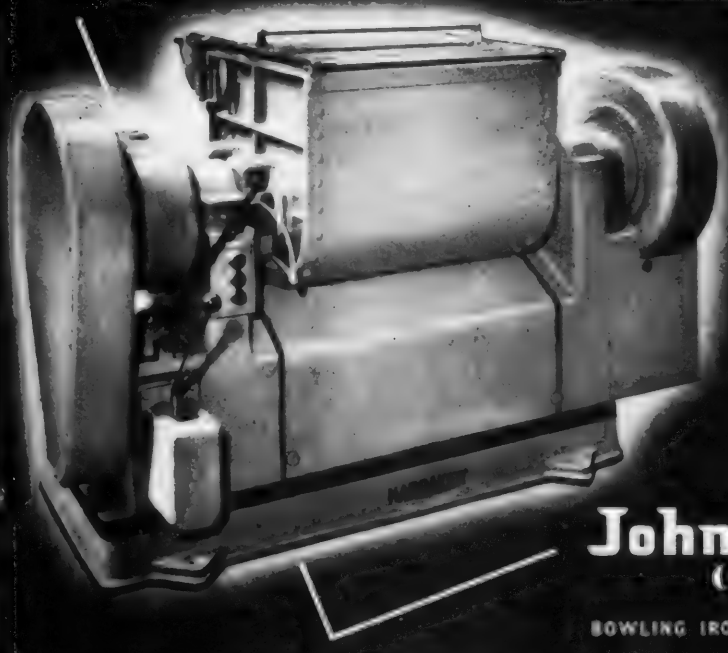

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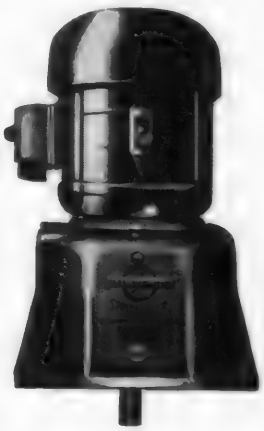

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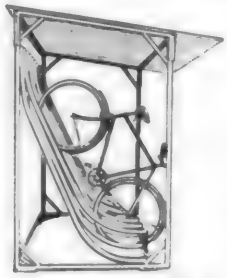
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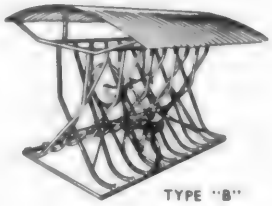
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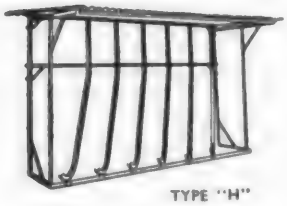
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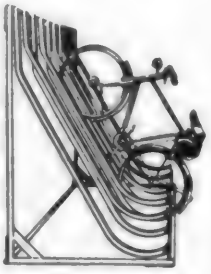
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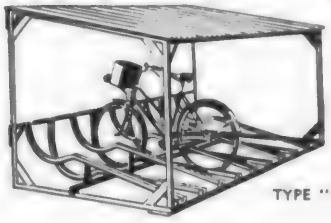
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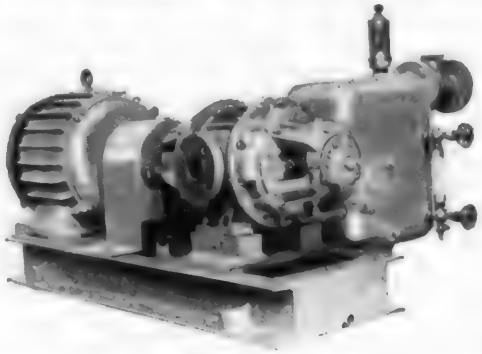

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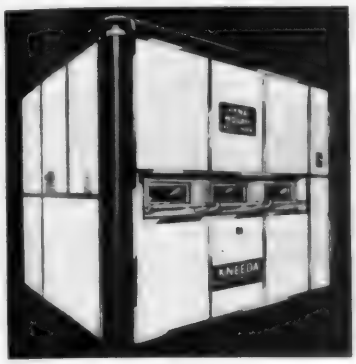

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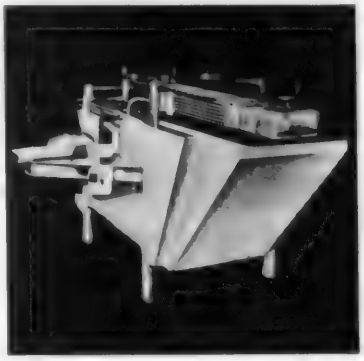

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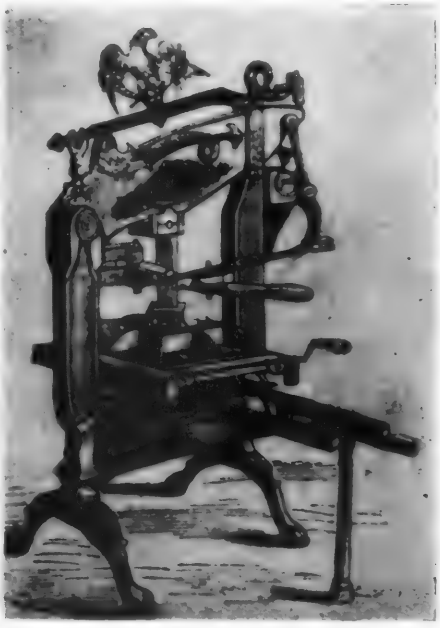

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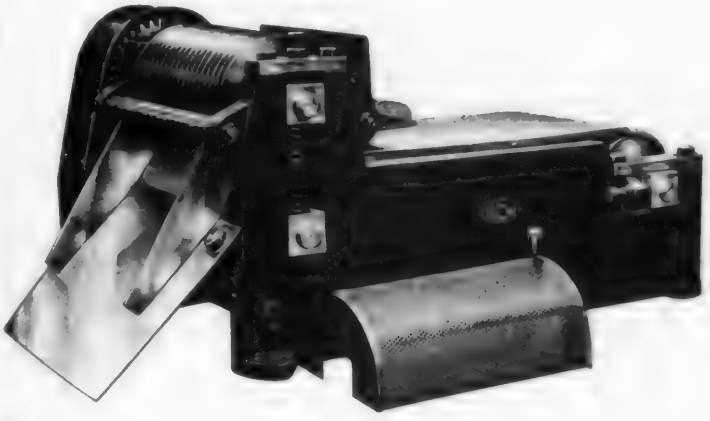

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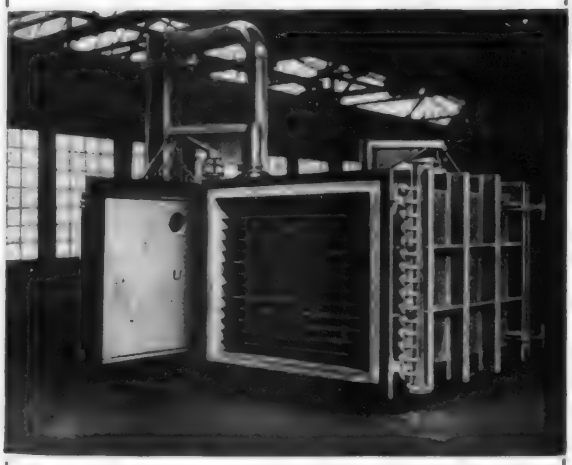

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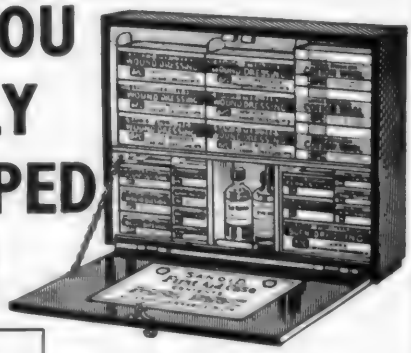

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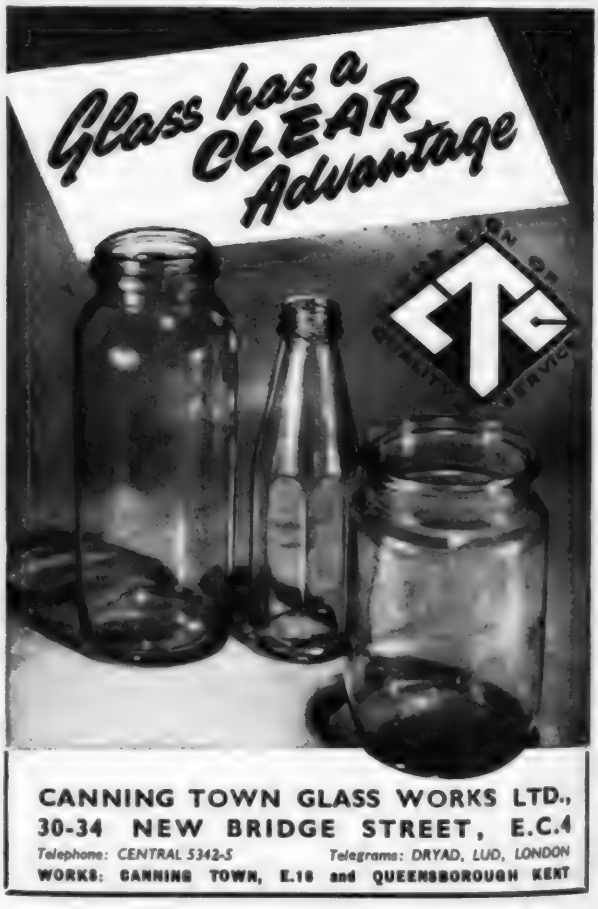

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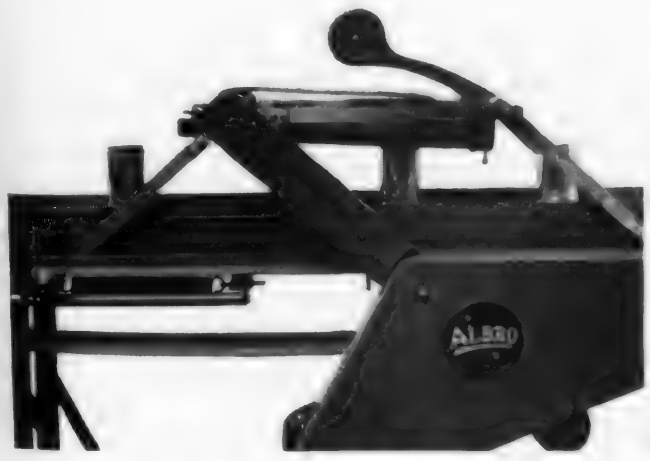

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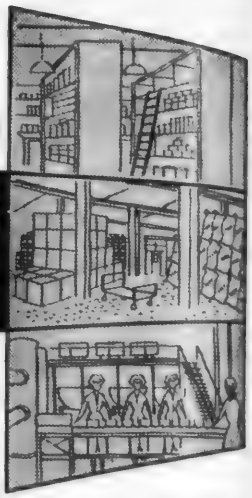

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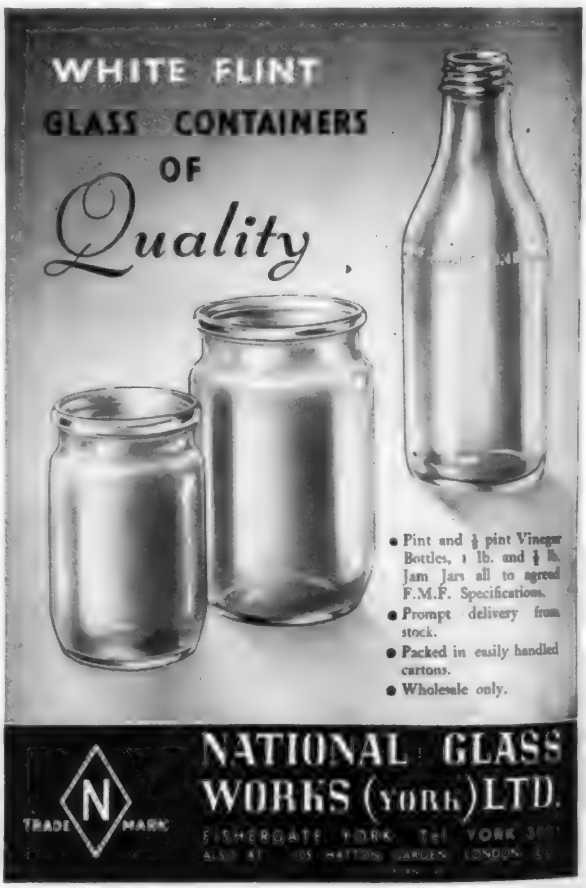
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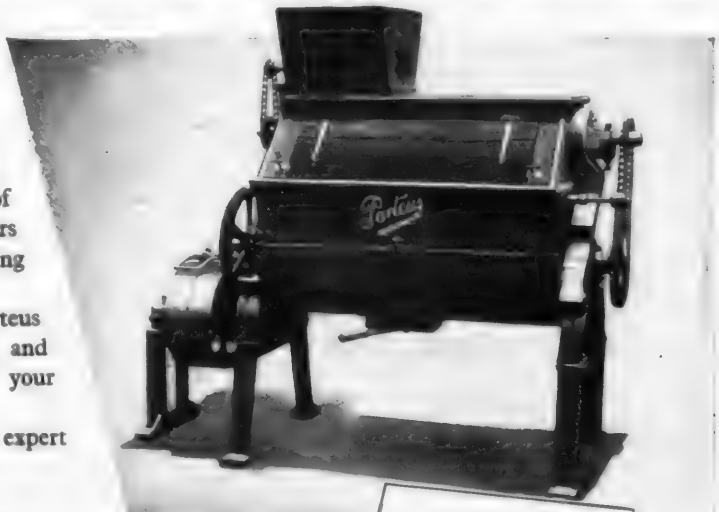

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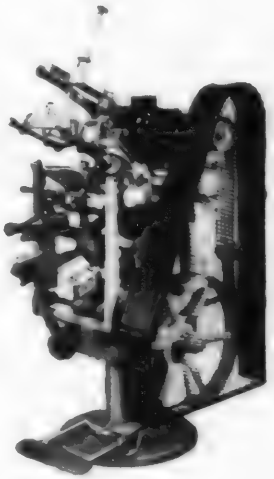

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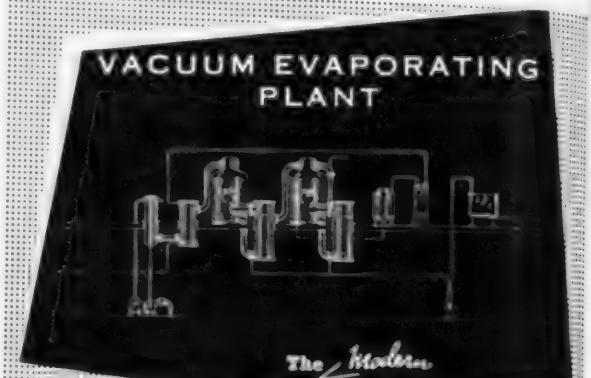

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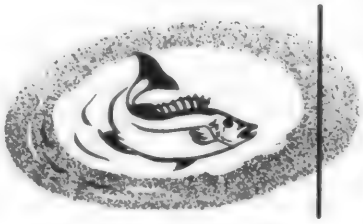

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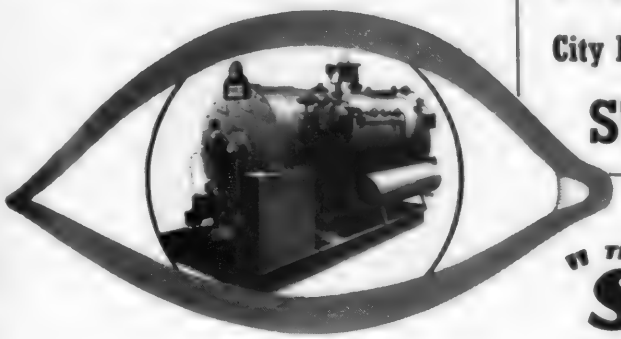

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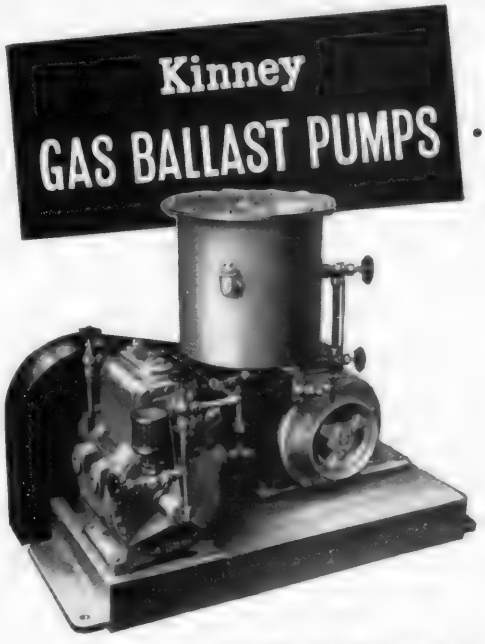

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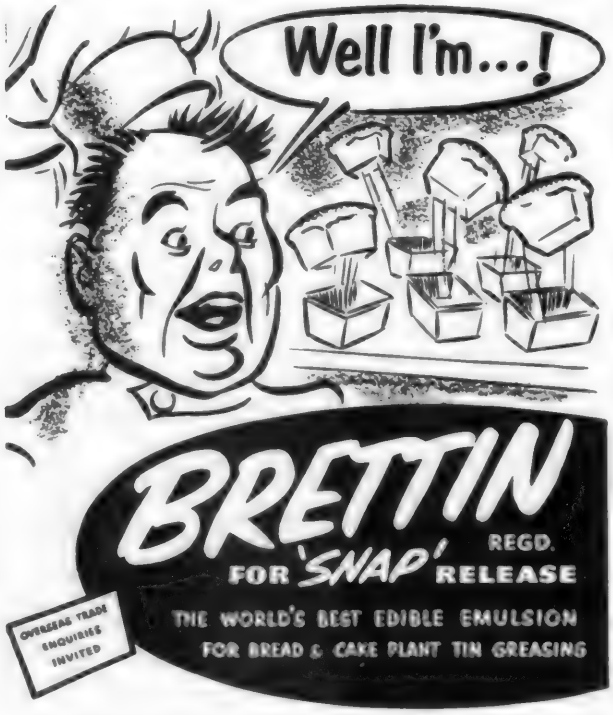

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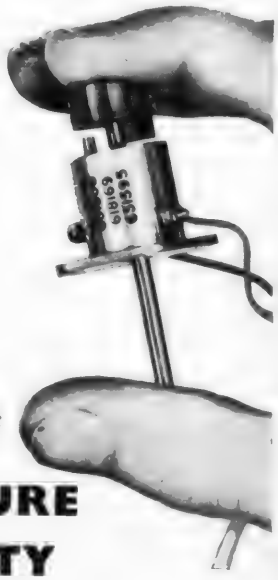

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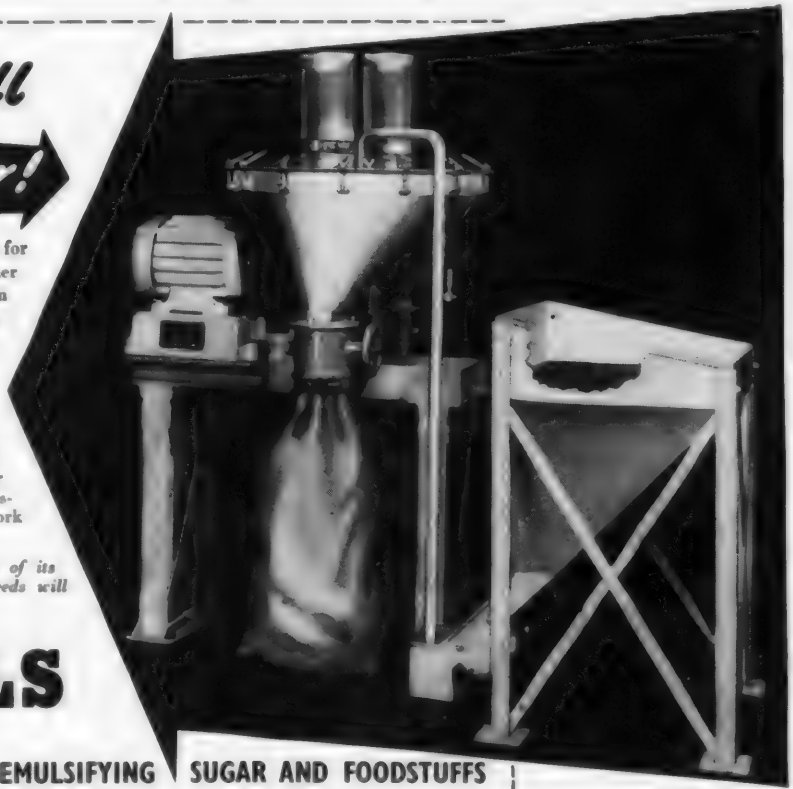

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DAIRY Bacteriologist required by old-established company in the North-West. Special experience in the application of aroma cultures in margarine production an advantage but not essential. Permanent position with good prospects and non-contributory pension scheme.—Apply stating age, qualifications and experience to Box B5100.

VACANCY occurs for Assistant Works Manager in Modern Canning Plant. Could be opportunity for foreman with necessary experience and qualifications.—Write in first instance to the Managing Director, Montrose Canned Foods, Woodlands Park, Maidenhead.

THE Milk Marketing Board requires a Graduate Chemist (male or female) to be responsible to their Chief Chemist for the supervision and organisation of the routine analytical work in its central laboratory at Thames Ditton. Applicants must have the ability to control a staff of about 20. A knowledge of microbiology would be an advantage. Salary according to age, qualifications and experience.—Applications in writing to the Establishment Officer Milk Marketing Board, Thames Ditton, Surrey.

THE Milk Marketing Board invites applications for a vacancy on its central laboratory staff at Thames Ditton. The duties of the post involve the supervision of the work of creamery and butter-fat testing laboratories in England and Wales. Applicants should have some years experience of dairy laboratory work. Salary according to age, experience and qualifications.—Applications in writing to the Establishment Officer, Milk Marketing Board, Thames Ditton, Surrey.

SUPERVISOR required for small fruit and vegetable canning factory in Manchester area. Applicants should preferably have some years experience in the maintenance of can seaming machines. Salary according to age and qualifications.—Apply Box B5104.

FOOD Packing: Experienced man required to take charge of factory in London area engaged in the packing of cereals, flour, dried fruits, jelly crystals and allied lines. Must be capable man, able to introduce new lines and control staff and general administration. First-class opportunity for right man to reach Directorship level.—Write full particulars, experience, age and wage required to Box B5105.

SAUSAGES/Cooked Meats London Factory Manager required. Able to produce regular quality and know costings.—Apply Box B5108.

GLASS Bottle Manufacturers, H.P. Sauce Ltd. invite applications for the post of Assistant to Production Manager at their glass bottle manufacturing subsidiary. Experience of automatic bottle making plant is desirable but candidates with an engineering background, practical ability, energy and ambition will be considered. The Company which is situated in the Midlands has a non-contributory pension scheme and the post offers an opportunity of early advancement to the right man.—Replies will be treated in confidence, and should be addressed in the first instance to Mr. T. D. Morison (Section G), Mather and Crowther Ltd., Brettenham House, Lancaster Place, London, W.C.2.

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Replies to

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should be addressed to

Food Manufacture, Stratford House, 9 Eden Street, London, N.W.1

SITUATIONS VACANT

RESEARCH and Development Chemist required for Food Manufacturing Company in West of England. Knowledge of confectionery production an advantage, but applicants must have had experience in development work and be prepared to work closely with the Sales Department. Age: 30-55. A substantial remuneration will be paid to the successful applicant.—Write Box B5112.

NORTH London Food Cannery requires male or female Laboratory Assistant for quality control. Work, a sound knowledge of basic analytical technique, adaptability, and initiative are the essential qualifications.—Write in confidence to Box B5113.

FOOD Manufacturers require a Works Manager for their modern factory in the South of England. Applicants familiar with modern automatic machinery preferred, and those with flair for development of new products favourably considered. The post is an important one and calls for wide experience in technique and managerial control.—Full details in confidence to Box B5114.

WM. GUNSTONE and Sons Ltd., require a Chief Engineer to be responsible for the maintenance and installation of all manufacturing Plant, Boiler Plant, Refrigeration and all other services installed in their Bakery, Biscuit Factory and Meat Products Factory. Must have sound technical qualifications and ability to control, plan and direct labour. Pension Scheme available.—Apply to Secretary, Wm. Gunstone and Sons Ltd., Broad Street, Sheffield, 2, giving full details and salary required.

FACTORY Manager required by the Vita-Ora Ltd., for their factory in Cyprus, Canning Fruits and Vegetables, and producing Fruit Juices. Must be fully experienced, have good organising ability and able to take full control, House provided.—Apply in strict confidence stating age, experience, salary required to Box B5057.

AN excellent opportunity for a young man educated to inter B.Sc. standard to be trained with a view to taking over a Department manufacturing and bottling Fruit Juices. A practical and mechanical applicant is essential, together with the ability to control labour. Good prospects for the right man.—Apply in strict confidence, stating age, experience and salary range to Box B5056.

FACTORY MANAGER required by a large firm of Fruit and Vegetable Canners. Only applications from men of first-class experience, organising ability and control of labour will be considered. A good salary will be offered and a house is available. Contributory Pension Scheme.—Full details in strict confidence, age, education, experience, present and past salaries received, to Box B5093.

APPLICATIONS are invited for Supervisors, Male or Female, with experience in the Fruit and Vegetable Canning Industry. Must be able to control labour and understand the seasonal demands of the Canning Industry.—Full details in strict confidence, age, experience, salary range, to Box B5079.

SITUATIONS WANTED

CANNERY Manager, 47, seeks change. Long experience canning, jam and squash making, including buying, factory control, distribution. Skilled accountant. Prefer country post South or West England.—Box B5109.

MAN 38, wishes to return to Industry after 4 years absence, experienced all branches Bakers' Sundries, experimental and production knowledge Preserves and Canning, five years Polytechnic training Flour Confectionery years Polytechnic training Flour Confectionery.—Box B5116.

YOUNG executive seeks Working Directorship Partnership in Food business. Experienced in practical working and administration. Capital investment considered.—Box B5120.

FACTORY Manager, widely experienced all aspects of Fruit and Vegetable Processing including Quick Freezing, seeks position with full scope for initiative and future development.—Box B5123.

GRADUATE Chemist, aged 30, experience in quality control and production in Fruit Canning. Desires position along similar lines with opportunity of Vegetable Canning Production.—Box B5124.

BISCUIT Production and Technical Manager (British, married); 24 years experience in biscuit trade. Thorough knowledge of mixing, machining, depositing, baking and packing of biscuits, wafers and creams. Also had previous experience overseas.—Box B5077.

MISCELLANEOUS SALES

OPEN Top Carboard Trays to hold twelve 1 pint bottles with divisions. 10,000 new unprinted.—Box B5107.

LARGE quantities of 1 lb. and 2 lb. pot and vitrified earthenware potted meat or pie dishes for sale. Stock includes round and oval dishes. These dishes are cheap for quick sale and special price will be given for large quantities.—Please reply to Box B5097.

SODIUM Alginate, Lecithin, stocks held by direct importers.—L. E. Pritchitt and Co. Ltd., Hatch End, Middx. Tel.: Hatch End 2334.

HAND TRUCKS, tubular steel, remarkably light and strong. Pneumatic tyres. Roller bearing wheels. Platform, 5 ft. 4 in. by 2 ft. 9 in. Carrying capacity 10 cwt. £14 2s. 6d. Immediate delivery. Write for illustrated catalogue.—Sterling Pump Co. Ltd., Spalding. Tel.: 2404.

ESTABLISHED manufacturers invite enquiries for genuine Worcestershire Sauce at 13/6 gall., ex works.—Tamar Indien, Harders Road, Peckham, S.E. 15.

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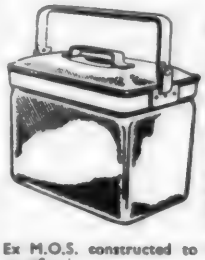

50/- each carriage paid in dozens

55/- each plus 2/6 carriage and packing smaller numbers.

Capacity 6 gallons.

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Complete with lid as illustrated plus inner anti-splash lid. Handle swivels flat thus securing lids when in transit.

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THE proprietor of British Patent No. 651754, entitled *Improvements in Apparatus for Cooking or Heating Syrups and Like Fluids*, offers same for license or otherwise to ensure its practical working in Great Britain.—Enquiries to Singer, Stern and Carlberg, Chrysler Building, New York, 17, N.Y., U.S.A.

AGENT well-established with Wholesale and Multiple grocery buyers in Scotland now considering a further agency. Companies desiring efficient representation and able to give adequate support in this market are invited to communicate particulars.—Box B5119.

RETIRING Manufacturer wishes to transfer Trademark, Process and Plant for manufacturing Chocolate Spread and Syrups to an existing Food Manufacturer on profit-sharing basis; or would consider selling outright, including factory.—Box B5121.

REPUTABLE Company having Factories within easy reach of London, Midlands and in the West Country can offer production facilities especially during winter months. Male and female staff available. Experience in assembly and or packing work. Transport and all services available.—Write in confidence Box B5122.

MANUFACTURERS and Investors. Why not establish a Branch in the Republic of Ireland where strikes are almost unknown and labour is plentiful? Write us your requirements in the matter of factory premises and/or sites.—Grew's Estates Ltd., 54, Dawson Street, Dublin. Tel.: 77003/4. Telegrams: "Grew, Dublin".

IMPORTERS interested in Shelled Prawn, boiled as well as dry salted; Prawn Chutney; Mango Pulp in brine; Mango Chutney; Puppodums; Madras Curry Powder; fresh peeled and sliced Ginger preserved in brine and vinegar packed in teakwood barrels; and general produce from Southern India.—Apply to Eastern Produce Trading Co., P.O. Box 17, G.P.O., Madras.

DE-GREASING and Cleaning Down! One man can do the work of five with B. and A steam-cleaning-with-detergent equipment; ready for use from your own steam supply. "Speedylectric" high-efficiency steam lance; 30 ft. steam hose; 15 ft. detergent hose; £40 complete. Ideal for the Food industry.—Bastian and Allen Ltd., Leaflet L.30, Ferndale Terrace, Harrow, Middlesex.

WELL-KNOWN Scottish Pie Makers can offer attractive terms to Agents with own transport. Goods despatched to any part of the country by passenger train. Branded line, goods packed in cardboard cartons, each containing one dozen.—Trade inquiries to V. C. Pies Ltd. Glasgow. Tel.: Maryhill 1048.

FULL Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

COPPER Tubing, 99 lengths by 16 ft. solid drawn. 1⅛ I.D., 1⅜ O.D. Second-hand, in nice condition. 15s. per foot, ex works.—Warrington Canners Ltd., Riverside Works, Penketh, Warrington.

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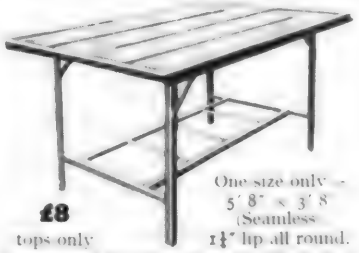

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Guaranteed Corrosion and Acid Resisting Throughout

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Buyers requiring rigid and flexible tubes and sections in thermoplastic materials should ask for a quotation from Marley Extrusions Ltd., Dept. 147 Lenham, Maidstone Kent. Harrietsham 381.

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WOODEN trays required; between 4 in. and 6 in. deep.—Barlow's of Croydon Ltd., Station Road, Edenbridge, Kent.

FOUR OZ. 80 mm. phœnix glass tongue moulds required, any quantity.—Please reply giving full details and price to Box B5098.

WANTED TO BUY BUSINESS SPICE & DRUGS
Preferably in provinces in the Wholesale. Grinding or Packing of Branded Spices.
Investment in expanding business considered.
Details to Box B5115.

ADVERTISER purchases Waste Fats and Oils.—Give full details and forward samples to L. R. Stevens, "Stella Maris," Dirtham Lane, Effingham, Surrey. Tel.: East Horsley 3229.

WANTED: Surplus Stocks of Jelly Cartons. Disused Brands. Large quantities.—Write: Angel Food Products, 74, Upper Street, London, N.1.

DAMAGED or redundant stocks of food, residues or by-products in large or small quantities required.—Send your offers to Rotunda Foods Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

SECOND-HAND Tins. Large quantities of ex M/F Frozen Whole Egg type tins wanted weekly. Size 12 in. by 6 in. by 6 in.—Warrington Canners Ltd., Penketh, Nr. Warrington.

MEDICAL bottles; tablet bottles; jars; bottle closures, bakelite and metal purchased. Best prices paid.—Samples and full details in first instance to Noel Davold and Co., 9, Laurence Pountney Lane, Cannon Street, London, E.C.4. Tel.: MANsion House 3951-2.

MANUFACTURERS wish to contact a factory capable of packing frozen fruits in special retail packs, must also be able to cope with experimental marketing quantities on occasion.—Details of capacity and scope to Box B5083.

TO MANUFACTURERS OF PRE-PACKED FOOD LINES SUITABLE FOR THE RETAIL OR CATERING TRADE

Have you any dormant or slow selling goods that you wish to clear which are taking up valuable space? We are spot cash buyers for any quantity of the above.

Send details to:
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ANGEL WAREHOUSE CO. LIMITED
ISLINGTON GREEN, LONDON, N.1
CAN. 3247 (10 lines)
(Please mention this advertisement when replying.)

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HOMOGENISERS, several sizes, also stainless steel Tanks, good condition.—Box B5101.

TWO Perkins Auto Cap Curlers for sale. Capacity 1¼ in. to 3½ in. diam. Chute feed. Motor drive.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

AS New Baker Perkins 100-gall. capacity double Z, stainless steel lined, Mixer. Stainless steel blades, underslung tilting, in first-class condition.—Box B5103.

VERTICAL gas-fired Steam Boilers, 4 ft. 6 in. by 19 in. diam., 80-lb. pressure. Ditto, 4 ft. 6 in. by 18 in. and 48 in. by 19 in., both 100-lb. pressure. Brockhouse 2-VS ditto automatic feed, 144-lb. evaporation, 100-lb. pressure. "Crispa" electric Potato Crisping Machines, twin-feed. Crypto Moroil electric Oil Extractors, 12-in. basket.—A. H. Kimmins and Sons Ltd., Lyndhurst Road, Worthing.

250 AND 500 gall. stainless steel Tanks with agitators; Benhil Butter and Margarine Packer; Pasteuriser; Ovens; Mixers; Kneaders, etc.—Your enquiries welcomed. Sorensen Bakery Equipment Ltd., 42, Raby Street, Manchester, 16. Tel.: Moss Side 2054. 'Grams: Rahbek.

"CHOCO-MASTER" enrobers and covering chocolate. Let us send you details.—Sorensen's, 42, Raby Street, Manchester, 16.

GARDNER Sifter and Mixer, 5 cwt., size H, in good order. Also one D size, 100 lb. capacity.—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

SECOND-HAND PLANT WANTED

WANTED: Tanker wagon; rigid or artic.; 350/1,000-gall. capacity; 6-7-ton payload; pump and power takeoff with 4-in. delivery lines suitable for sugar syrup.—Reply with full details and price to Box B5099.

BROAD Bean Podder required, second-hand but good condition. Suitable for extensive experimental work, power unit unnecessary. —Full details to Box B5106.

ELECTRIC Sieve required by Barlow's of Croydon Ltd., Station Road, Edenbridge, Kent. Must be in good order.

MOTORISED Sifting Machine required by Barlow's of Croydon Ltd., Station Road, Edenbridge, Kent.

Hy-tra-lec Packing Machines.

£350 offered

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Four machines wanted.

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FOR SALE, second-hand Gabel Chocolate Depositing Machine with conveying tapping table, in good working order.—For details and price write to Box B5110.

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3,350-gall. Aluminium cyl. Open Tank, 9 ft. diam. by 8 ft. 6 in. deep. Drum Mixer, 54 in. diam. by 40 in. wide; Two Rotary Gas Dryers, 2 ft. 8 in. diam. by 5 ft. long, 415 230 3—50; 2,000- and 500-gall. jac. glass-lined cyl. enc. Tanks; 2,000- and 1,000-gall. Alum. Vehicle Tanks; 72 in. by 36 in. wide Belt Conveyor with inclined 20 ft. troughed section; 30 "Z" and Fin Blade Mixers up to 38 in. by 28 in. by 31 in.; 20 "U" Trough Mixers and Sifter Mixers up to 7 ft. 6 in. by 3ft. by 3 ft.; s.s., copper, cast iron and mild steel jac. Pans. Disintegrators, pumps, refiners, hydros, condensers, boilers, ovens, autoclaves, steam and diesel plant, elevators, conveyors, etc.— HARRY H. GARDAM AND CO. LTD., STAINES.

DUCKWORTH Automatic Jam Filling Machine in new condition with jam tank, motor drive and parts for ½, 1 and 2 lb. jars. B.C.H. 8-in. stainless steel Pulping and Sieving Machine with two stainless steel sieves. B.C.H. 40-gall. capacity stainless steel tilting steam jacketed Boiling Pan, suitable 70 lb. s.w.p.—Apply C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Vandyke 2406.

GARDNER "J" Size 15-cwt. capacity Powder Sifting and Mixing Machine, fitted with brush sifter and enclosed worm and wheel reduction gear. Perfect order.—Apply C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Vandyke 2406.

FOR SALE: Baker Perkins Savvy Jean-Jean Chocolate Enrober. Universal model for bottoming, bottoming and sides or entire enrobing. With 40-ft. cooling tunnel and new "Stern" Refrigerating Unit. £800 delivered. One new Baker Perkins Cream Mixing Machine- £350 delivered. One new Baker Perkins Overcut Saw. £260 delivered.—Box B5117.

HOBART, Peerless and Melvin Bowl Mixers, 80-quart and 20-quart bowls, motorised. "Artofex" Kneading Machine 1½-sack bowl. "Crollie" Mixer, Elevator and Sifter, combined. copper Mixing Pan, steam-jacketed, by BCH, size 19 in. by 16 in. by 24 in. deep, 3 in. outlet. "Premier" Emulsifier, stainless, motorised. Bottle Filling Machines for vacuum operation, with stainless contact parts. Vacuum Pumps 5 in. by 8 in. str., 2-cyl.— Welding's, Saxone Bdgs., Tarleton Street, Liverpool, 1.

FOR SALE: Solvent Extraction Plant, 2½ ton batch, consisting of storage tank, evaporator extraction vessel, lift out basket, 5-ton electric travelling block, separator, condenser, steelwork and piping complete, price £3,000.—Box AX 431 Lee and Nightingale, Liverpool.

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ASCOLI fuel-less cooker for sale. New condition, only used 2/3 times. Large capacity. Warrington Canners Ltd., Penketh, Warrington.

TWO excellent Gardner 5-cwt. size Combined Sifting and Mixing Machines, and one 3-cwt. size. One revolving drum-type Horizontal Mixer, 3 ft. 9 in. long, 6 ft. 4 in. diam., and 7 h.p. A.C. motor. Can be used for tea, dry powders, granular materials, seeds, etc.,— Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

GARDNER Sifter and Mixer, 5 cwt., size H, in good order.—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4

FULLY Automatic Wrapping Machine, 1955 model. Suitable all rectangular packages, length 5½ in. to 18 in., width 3 in. to 7 in. Over 700/hr. Uses cellulose film, waxed paper, etc. £548.—Kneeda Co., Lots Road, Chelsea, S.W.10.

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600

FIVE new Twin Roll Spray Driers. Chilled c.i. rolls, 40 in. long by 32 in. diam., 74 lb. sq. in w.p., fitted air-cooled doctor blades rotary disc distribution trough, air-spray jets and worm discharge conveyors. Fitted stainless steel feed pump, jacketed feed tank and powder dresser.

Horizontal steam jacketed Drier by Parsburg, 23 ft. by 4 ft. diam. Fitted revolving reel of ten 4-in. diam. tubes around central tube, steam heated. Intermediate paddles for agitation. Jacket, w.p. 2 ats. With condenser, wet vacuum pump and fittings.

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Three new Vacuum Drying Ovens, welded m.s. construction, 7 ft. long by 42 in. wide by 42 in. deep, fitted nine steam-heated shelves to carry 36 acid-resisting trays, 36 in. by 16 in. by 1⅜ in. Davit-swung door each end, hand-wheel closing. Motorised horizontal wet vacuum pump, gauges, metal trays, etc.

Single Trough Mixer by Baker Perkins, 10 cwt., 6 ft. 1 in. by 28 in. by 29 in. deep, m.s. construction. Broken scroll agitator, motorised 400/3/50. Trough and agitator tinned.

Trough Mixer by Werner Pfleiderer, twin Z blades. Trough 2 ft. 8 in. by 2 ft. 8 in. by 2 ft. 2 in. Hand tilting.

80-qt. Peerless Mixer, four-speed type with sun and planet-type agitator, 400/3/50. Fitted whisk and 80- and 50-qt. bowls.

Automatic Bottle Labelling Machine by Peters, Slough. Capacity bottles up to 10 in. high, singly 4 in. wide, in pairs 2 in.; 60 per min. singly, 120 per min. pairs. Motorised 400/3/50.

Automatic Capping Machine by Peters, Slough. Suitable for pre-screwed caps and bottles or jars. Capacity 200/300 per min. Sizes 2½ in. to 10 in. high by 4 in. diam. Motorised 400/3/50.

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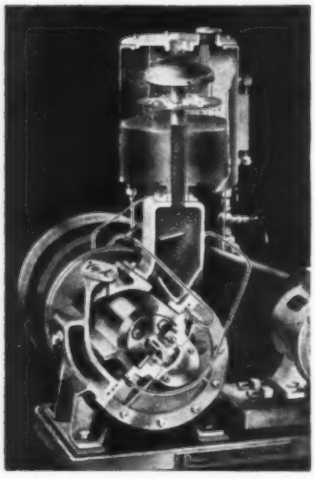

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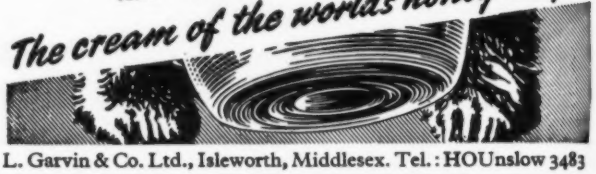

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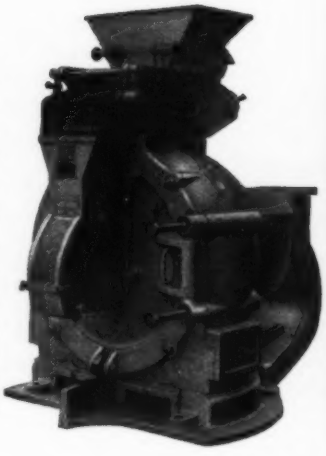

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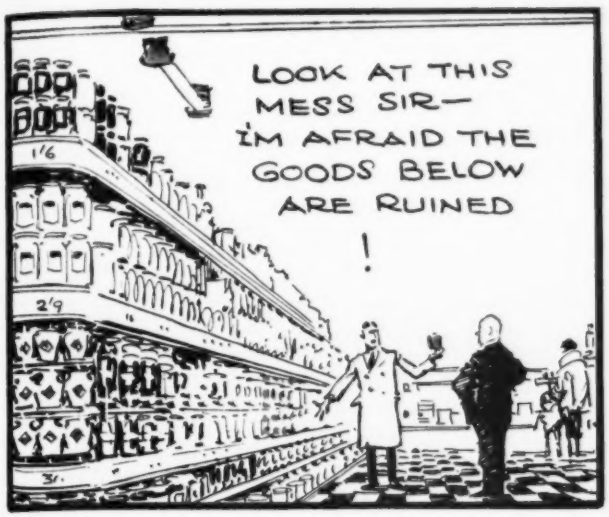

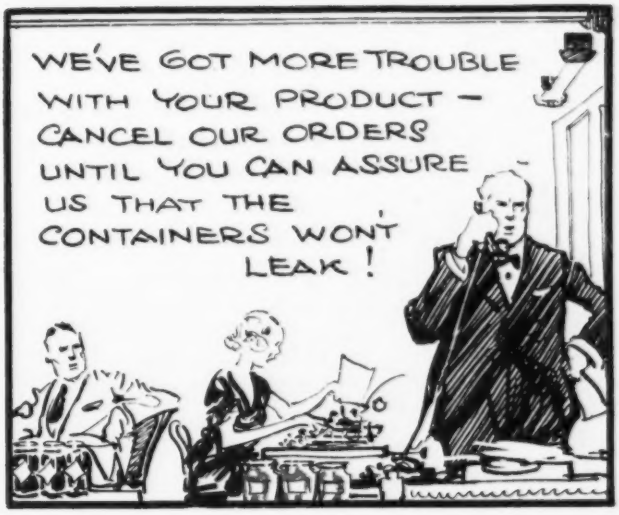

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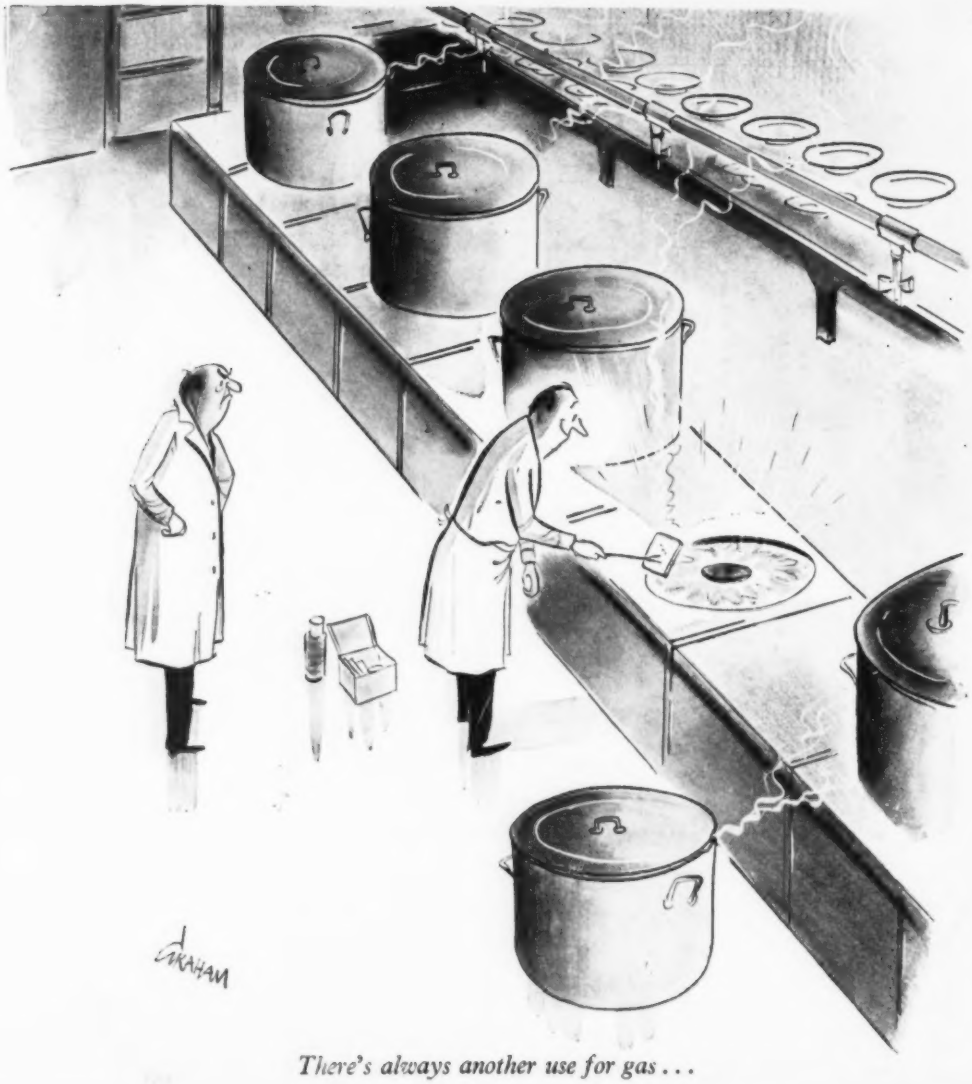

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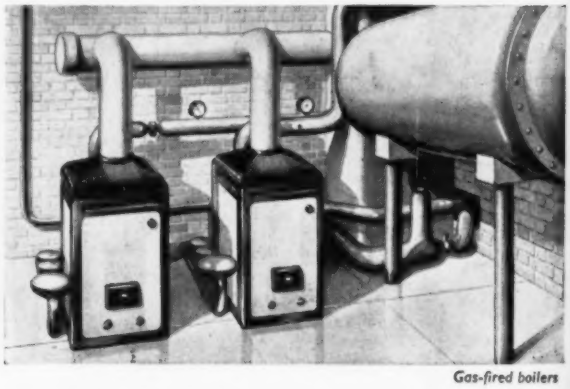

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